# CHEMICAL MARKETS

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## *The I. C. C. Decision*

EVEN those of us who most vigorously protested the flat freight rate increase to the railroads appreciate that the carriers are in a critical situation, and the decision of the I. C. C., frank compromise that it was, serves to emphasize some of the ramifications of the railways' plight.

FINANCED chiefly during the past two decades by bond issues, and with their labor costs set by contract, the railroads' fixed charges are high and rigid. With their selling prices, both for freight and passenger services, also set for them and the law limiting the reductions possible in personnel, they are trussed up in a straight jacket, certain to drown as they sink lower and lower with declining volume of business.

DESPITE this grievous necessity the I. C. C. could not, in a time of sharply falling values, raise freight rates. To have done so would have been to increase the country's freight bill some half billion dollars, an unfair and unsound increase in the overhead of all American business, an increase moreover, that from the point of view of the roads would have given the serious bus competition a ruinous advantage. On the other hand, Government control has been tacitly accepted by savings banks, insurance companies, trustees, and other investors of public funds as amounting to a guarantee of safety. These investments, in which the factor of safety is so widely and so vitally important, are at present in jeopardy.

THE dangers alike of fixed overhead and of Government control are plainly evident in this plight of the railways: a double warning to industrialists and statesmen.

A COMPROMISE was inevitable, and obviously it cannot be more than a stopgap. The roads probably knew this very well, and their next step is expected to be a move to reduce their wage costs. The form of the compromise, however, came as a distinct surprise in the unprecedented loan-to-weak-roads condition imposed by the Commission. Whether such a revolutionary proposal can be successfully imposed in spite of legal and economic objections, remains to be seen, and for the moment concerns the chemical industry less than the schedules it is proposed to advance. Again expediency, rather than justice or wisdom, prevailed. The rates are raised chiefly on cheap commodities shipped in bulk for comparatively long distances. Here the I. C. C. was plainly trying not to play into the hands of the buses. But they have increased the costs of a group of basic commodities, many of them chemical raw materials, which have already suffered more than their own share of deflation punishment. No other industry is more affected by these proposals, and small wonder protests are raised that again the Commission has neglected the old freight-rate-making principle based upon ability to pay, and worked rather upon the basis of inability to avoid paying.

***Price Fixing by Bayonet*** The Governors of Oklahoma and Texas have controlled the price of crude oil at the wells by bayonets. Yet this new and startling method of price-fixing failed to arouse more than a short ripple of interest among business leaders. Martial law has been invoked at the whim of a state executive to force prices to artificial levels without a protest. Overshadowing events here and abroad in international finance and politics, did divert attention from such high-handed proceedings, but it is an immaterial and irrevalent excuse to point out that the Governors were seeking to protect natural resources from waste. What has become of our boasted economic freedom and political liberty ?

When the militia closed oil wells in the Southwest to force acquiesence on the part of the refining companies to Governor Murray's dictatorial demand of a dollar a barrel, a splendid climax of the long series of economic cure-alls in the present crisis was reached. The accusing finger of ridicule pointed at Soviet Russia, and all it stands for in the way of economic fallicies, may well be dropped limply. The apathy of business leaders in this instance can only be matched by the jocular indifference of the citizens of New York City to the appalling mess being uncovered by Judge Seabury. Are we so dumb we do not understand plain facts ? Are we so callous to mis-government that neither unjustice nor theft stir us at all ? Are we so frightened we are powerless ? Such indifference betrays a lack of conviction that is appalling. For the principles upon which our Government are founded our forefathers left their families to the tender mercies of Indians and tramped barefoot over hundreds of miles of frozen roads to fight for the very cause we would not miss a golf game to defend.

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***Significant Statistics*** Any one of three excuses might have been made by the Tariff Commission for discontinuing the Dye Census:

1. Economy in Government administrations is a very real necessity.

2. "Comfort to the enemy" in laying before the dyestuffs industries of the world, the very complete facts of our own production.

3. An unfair advantage, so it has been termed by some of the small manufacturers, in that it furnished to their larger competitors more valuable information than they, with restricted resources, received.

The explanation given is even more flimsy than any of these three. According to press reports, Chairman Fletcher intimates that the Dye Census has been discontinued because the Commission has been subjected to criticism on the ground of rendering special and peculiar services to one small branch of a single industry. Remembering the origin of the Dye Census and appreciating its value, it seems to the industry and to disinterested observers, that the discovery of such charges at this late date is very far from the point.

Nor could the Tariff Commission have selected a more unfortunate time at which to stop this service. It has been a long up-hill pull to convince the executives of the chemical industry that the publication of accurate statistics on production, stocks on hand, and current withdrawals of the more important chemical products, was a wise and sound industrial policy. All have not yet been converted, but during the past ten years there has been much tangible progress in this direction. The current dislocation of supply and demand has emphasized to many how extremely valuable such statistics can be, and it is a very real tragedy that just at this moment that particular group of statistics which are famous throughout the industry as being the most complete and the most accurate published, should thus be discarded. The Dye Census was not only valuable in itself; it was invaluable as an example. It is to be hoped that the strongest possible pressure will be brought to bear in Washington to have this work resumed promptly and completely, and even if possible, extended to other branches of the chemical industry.

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***Competition From the North*** Canada, according to figures recently released by the Department of Commerce, holds seventh position among world chemical producers with an output of $122,267,000 in 1930, approximately three per cent of the total world production of chemical products.

This country is Canada's best customer, having received over nine million dollars worth out of an export aggregating sixteen million in 1930. Canada, on the other hand, has been our best customer for the past three years. Our shipments have in recent years averaged close to thirty million dollars, about seventy per cent of Canada's total imports.

The past few years have witnessed the completion in the Dominion of Canada of several ambitious expansion programs, the majority of them in the last twenty-four months. These undoubtedly will have a profound effect on our chemical trade to the north. Do these

new undertakings described in S. J. Cook's article on Canada's chemical advances mean a decrease in our export business in that country? Most certainly many important and far-reaching realignments will become necessary. Canadian natural resources are tremendous. In addition, Canada is blessed with cheap water power, a powerful factor in considering chemical processes of the future. In many ways plant locations in Canada are ideal in the eyes of the efficiency engineer although one point is certain, the average haul to the final consumer is much greater than in this country.

Already many American chemical producers have found it profitable to establish branch plants. In 1930, 113 such plants were in operation, turning out products valued at $44,836,000. By far the largest single division was the pharmaceutical. It is well to remember, however, when considering the possible competitive effect present and future growth in Canada will exert, that the sale of industrial chemicals, those that are bulky and heavy, is defined within very narrow limits because of prohibitive transportation charges. While Canadian manufacturers may, and probably will, cut into our present exports it is unlikely that they will except in special cases threaten seriously to share in this country's domestic consumption. A Canada with a productive capacity in excess of home needs, would be compelled to compete with foreign countries including the Mother Country in the export markets of the world.

## *Quotation Marks*

It is dangerous, these days, for any manufacturer to be far removed from sound scientific advice—*Dr. Julius Klein, Asst. Secretary of Commerce.*

Patent appeals in our courts are too complicated, too likely to result in long delays, great expense, and even in what often appears to be gross injustice. This is chiefly the consequence of the simultaneous jurisdiction of ten separate federal circuit courts, each of which is final within its own jurisdiction. Ten different decisions are conceivable in a single case and there is no certainty of coordination of the decisions in the Supreme Court of the United States.—*Chemical and Metallurgical Engineering.*

College professors have a reputation for developing ideas which are more ingenious than practical. A recent example of this tendency is a bill drafted by a professor at Yale, providing for the regulation of the sale of all poisonous volatile substances under a criminal statute.

The misuse of poisonous compounds by the general public from pure ignorance is another proposition entirely, and worthy of care and fore-thought as to methods of control. But any movement in this direction should recognize the complete difference between such a condition and the needless waste of time and trouble which would be inflicted upon the men whose lives have been devoted to the knowledge of chemistry and the use of chemicals in every form. The distinction between experts and the general public is like light and darkness and should be so considered.—*Paint, Oil and Chemical Review.*

Truthfully it can be said that America is a land of laboratories.—*Nation's Business.*

The various trade association organizations, some known as associations and others as institutes, are finding it difficult to conduct their activities under present conditions. We have learned with regret that at least one great association, which has been a power in furthering the interests of the industries of which it is composed, contemplates so great a reduction in its program as virtually to destroy its usefulness. This is a time for increased association activities, but it is likewise a time to cease duplication of effort and to improve service to association members through a consolidation and merging of those institutes whose interests are very similar.—*Industrial and Engineering Chemistry.*

Trades and industries generally complain of the upset being caused by cut-throat competition that presents its destructive side in making prices which are below the cost of production. The heedlessness of one producer may affect an entire industry. Trade bodies find it impossible to regulate, within their own ranks, on account of governmental restrictions, a most troublesome and unsettling condition. In the eagerness to secure orders, all bounds of sane competition are frequently overstepped by a wholly unwarranted slash in prices. Such a course destroys profits, threatens employment and promotes instability.—*Manufacturer's Record.*

## *Fifteen Years Ago*

**(From our issue of November 1916)**

Blair & Co., New York stock brokers offer $4,500,000 7% United Dyewood Stock.

U. S. Production of benzol reaches 30,000,000 gallons.

New York Quinine & Chemical Works moves the New York City offices to 100 William St.

Dow Chemical Co., declares an extra dividend of $5 a share.

Thomsen Chemical Corp., Baltimore sulfuric acid producers give employee bonuses amounting to 5 to 17% of annual salaries.

New Jersey and Pennsylvania adopt new safety regulations for chemical plants.

A Drug and Chemical Exchange is suggested for New York.

# A Challenge to American Phosphate Rock Supremacy

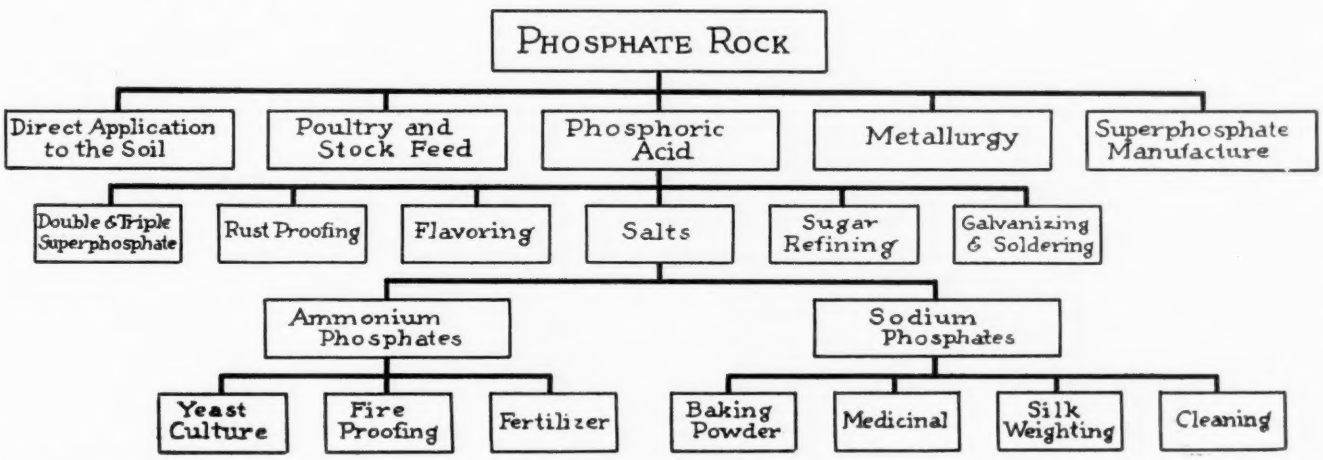
By Joseph Kalish

**WRITING of the Moroccan phosphate mines, which began operations in 1921, R. Chapus in his book, "Exploitation of Moroccan Phosphate" says: "...If it is certain, on the one hand, that the Office Cherifien could, if it is wished, cause the complete ruin of other North African phosphate miners, it is equally certain that it has never sought this, and on the contrary, its only avowed purpose is to eliminate from the European market American phosphates of high strength, and once this end is attained, to seek increased exports either in the increase of European consumption or in investigations of new outlets. The Office thus touched South Africa for the first time in 1925 and exports to this region have increased regularly since then; in 1926 Australia was touched for the first time, and in 1927 the United States."**

How well Morocco has accomplished its avowed object is well shown on the accompanying graphs. Total Spanish imports have steadily increased (production being negligible) from 243,165 metric tons in 1920 to 562,089 in 1929 while in contrast imports from the United States rapidly fell from 163,546 long tons in 1920 to 95,326 in 1923, rose slightly in 1924 and 1925 and dropped to 76,818 in 1929, having reached a low of 73,363 tons in 1927. Although imports from Algeria rose from 1926 to 1929, Morocco supplied increasing quantities of phosphate rock.

Similar tendencies are shown by imports into Great Britain and Ireland with Tunisian supplies exhibiting an increase, Algerian remaining at approximately the same level, while Morocco supplants the rapidly vanishing American phosphate rock. Total British imports have declined somewhat from the peak of 529,267 metric tons in 1920 to 481,167 in 1929, but a gradual upward trend was noticeable in the years preceding the last.

Belgium, too, though importing increased quantities of phosphate rock (124,960 metric tons, 1920; 359,091 in 1929) nevertheless shows a marked decrease in imports from the United States (95,084 long tons 1923 to 36,202 in 1929). Loss of this market may not, however, be ascribed to Moroccan competition, as imports from this source have fallen off markedly since the peak of 41,998 metric tons in 1926 to only 19,608 in 1929. On the other hand, Tunis, since 1922 the largest seller to Belgium, has steadily increased its proportion of the trade.



In Italy, the United States has made a good showing, with Morocco having steadily encroached upon the Tunisian market. Imports from Morocco, however, were greater in 1929 than those from the United States.

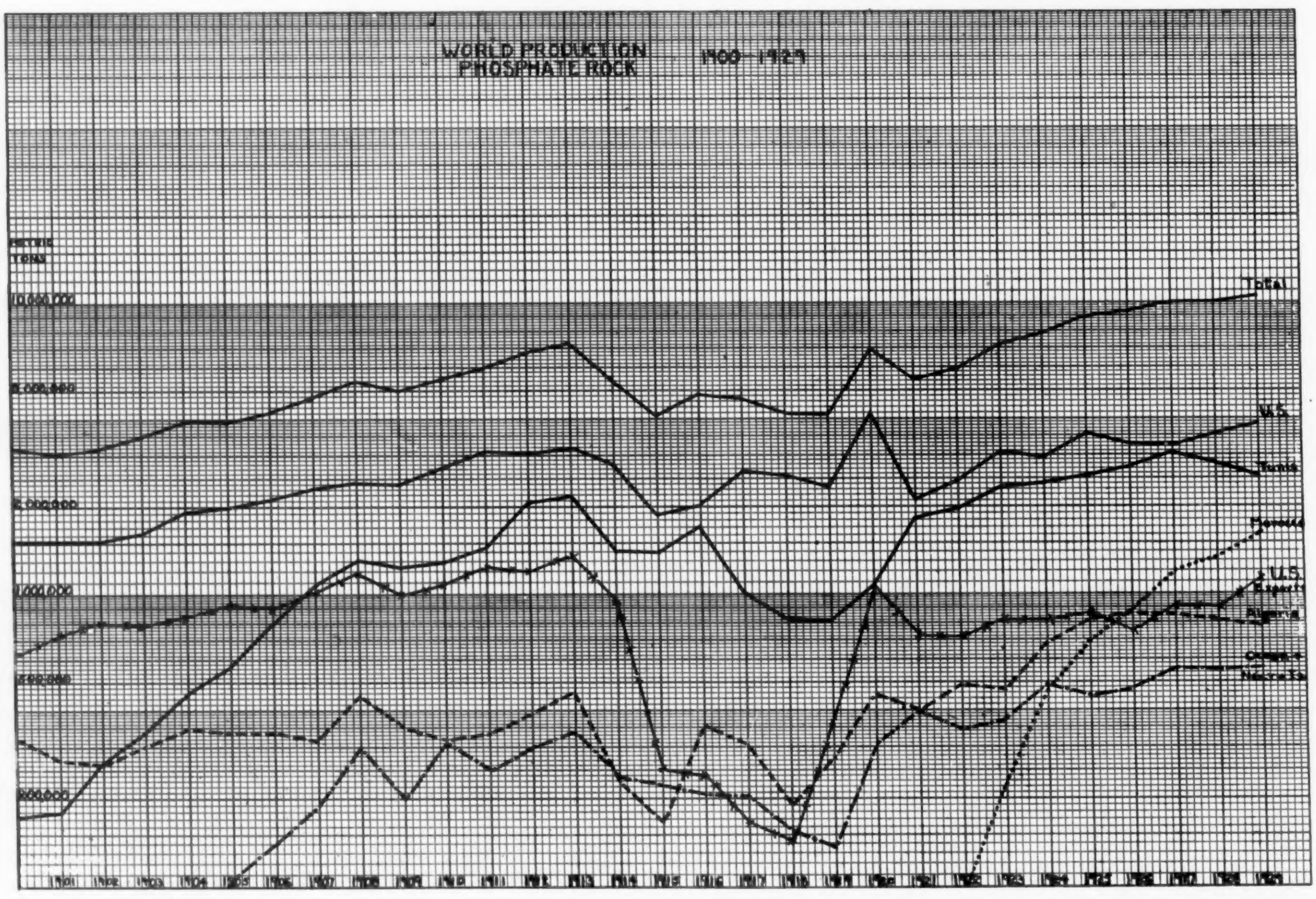
Morocco phosphate deposits, without doubt one of the most important, were opened up in 1921, although their existence has been known since 1912. They were taken over by the Moroccan government in 1921 and exploitation was begun under "L'Office Cherifien," the state borrowing the forms of organization of private companies. The state furnishes the capital, and appoints the directorate which selects a president. Employees have the same status as in a private company and are not considered to be government employees. Dividends go to the State. The development has been phenomenally rapid. In 1929 Morocco won third place among the phosphate producing countries, and a second deposit has been discovered recently and will probably be opened up in 1935.

Development may be attributed to two major causes—high grade product and low costs of operation. Moroccan phosphate not only analyses 75 per cent phosphate, with iron and alumina totalling less than one per cent, but also differs from other material of this grade in being softer and thus lowering grinding costs. Other North African rock runs less than 70 per cent B.P.L. (Bone Phosphate of Lime) and as the trend is towards more concentrated fertilizers, higher analyses command a premium. Moreover, mining is cheap in Morocco. Some convict labor is employed and these workmen are more efficient than free native laborers. Chapus attributes this to the better physical state of the men, due to healthier living conditions, and particularly to the more rigid discipline. Nature was lavish in its arrangement of the deposits in more ways than one. They are 150 kilometers from the port of Casablanca, but the journey to the coast is down grade and cars travel most of the way by gravity. Finally, Moroccan phosphate enjoys an ocean freight rate to European ports, about half of that from Florida. With a low priced material, this factor is of crucial importance. The port at Casablanca has loading facilities for double the present quantity of material.

How Morocco has employed its natural advantages is shown in the chart of world phosphate rock production. Increases of more than 100 per cent were marked in the years 1922, 1923, 1924, while since then output has increased at the rate of about 200,000 tons annually. In 1929, 1,378,523 metric tons were exported to Europe out of a total of 1,608,249 tons total exports. Shipments to South Africa have steadily risen from 5,751 tons in 1925, the year of the first shipment, to 56,249 in 1929, a ten-fold increase. Australia took 126,601 tons in 1928 against 6,258 in 1926 but imported only 91,070 metric tons in 1929.

Even before the appearance of Moroccan phosphate on the world market the United States did not enjoy a dictatorial position. North African producers, from

*Consumption of phosphate rock shows a gradual increase in the last 25 years*



their appearance before the turn of the century, were and still are factors. Algerian production began in a very limited way about 1889, but in 1894 mining began on a large scale and exports rose rapidly to over 300,000 tons in 1899. A peak of 452,069 metric tons in 1908 was only surpassed with 461,030 tons in 1913, but after the lean war years production leaped to 456,169 tons again, and rose, with minor recessions, to 857,247 tons in 1926. Tunisia deposits were discovered by Thomas in 1873 (when he also discovered phosphate in Algeria) but were first worked only in 1899. From 178,018 tons in 1901, production first exceeded one million tons in 1907 and had increased to 2,170,496 tons in 1913. The outbreak of hostilities brought lower productive levels, which continued until 1923 when output was 2,338,000 tons. Peak production of 3,041,000 tons in 1927 (3,331,430 for the United States) has declined to 2,511,000 tons in 1929, but this year showed top exports of 3,022,040 tons.

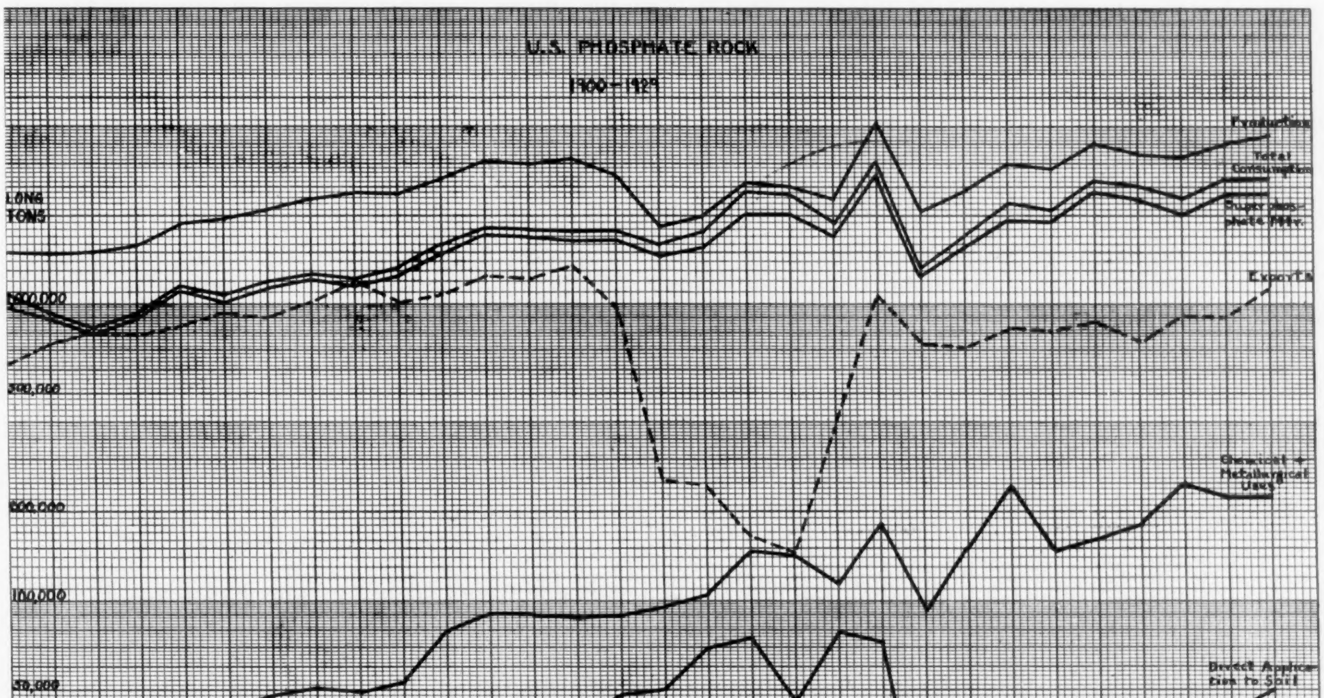
Belgium, before the World War, produced between some 200,000 tons of rather low grade rock annually, but since 1922 production has not exceeded the 67,600 tons. French production dropped, after the opening of the mines in its North African colonies from 476,720 tons in 1905 to 145,000 tons in 1915, 25,000 tons in 1916, and no recorded production for 1917 and 1918. In the post-war decade production has averaged below 200,000 tons annually.

Pacific island deposits are noteworthy for extremely high quality, containing from 83 to 85 per cent tribasic calcium phosphate. They are supposed to be petrified guano in which potash and nitrogen content have been washed away. These deposits are in Christmas Island, Angaur, Makatea, Ocean, and Nauru Islands. Japan, Australia and New Zealand are the major markets for phosphate from these sources.

Although world consumption of phosphate rock is increasing at a slow but steady rate, and consumption will some day probably be much greater than at present, nevertheless there is no cause for fear of exhaustion of the world's resources in this mineral. G. R. Mansfield, of the U. S. Geological Survey, has tabulated his estimate of world reserves as follows:

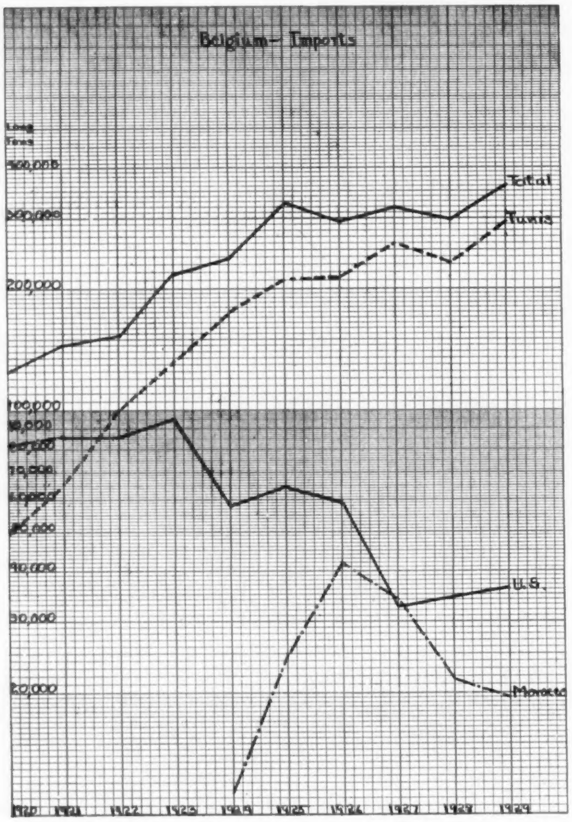
| *Country* | *Reserves Metric Tons* | *Grade % B.P.L.* |
|---|---|---|
| United States | 6,431,000,000 | 60-70+ |
| Tunisia | 1,000,000,000 | 58-68 |
| Algeria | 1,452,000,000 | 58-68 |
| Morocco | 1,400,000,000 | 70-78 |
| Egypt | 179,000,000 | 60+ |
| Nauru and Ocean Is. | 140,000,000 | 80-88 |
| Makatea Is. | 10,000,000 | 80+ |
| Angaur Is. | 3,000,000 | 80+ |
| Rasa Is. | 3,000,000 | 75 |
| Palestine | 4,000,000 | 47-80+ |
| Total High Grade | 10,622,000,000 | Generally 60+ |

*This Country has held an enviable position in phosphate rock production*



| Country | Reserves Metric Tons | Grade % B.P.L. |
|---|---|---|
| Russia | 5,568,000,000 | Less than 50 |
| Spain | 10,000,000 | " " 50 |
| Siberia | 667,000,000 | " " 50 |
| Total Low Grade | 6,245,000,000 | Less than 50 |
| Grand Total | 16,867,000,000 | |

Estimates of phosphate reserves made by the 14th International Geological Congress in 1926 were much

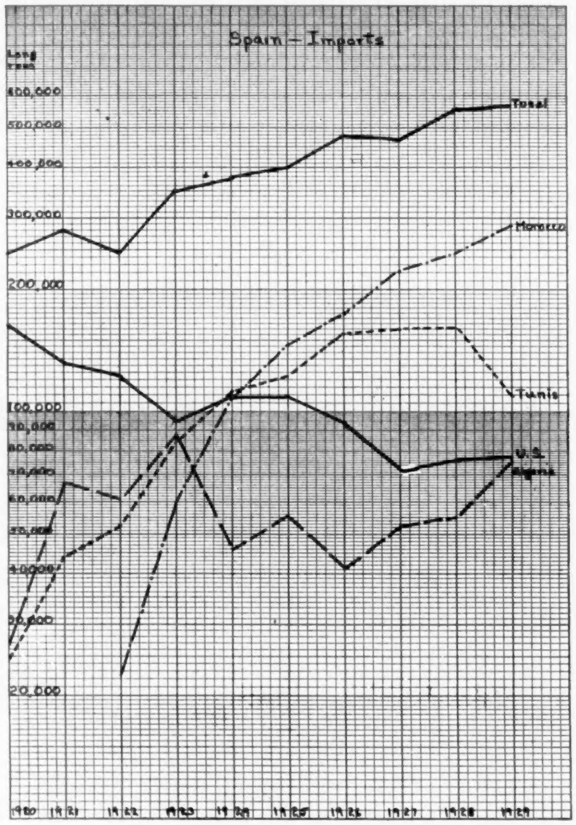



*Belgian import figures of phosphate rock*

greater than these figures: actual reserves, 7,172,400,000 tons with a $P_2O_5$ content of more than 2,333,400,000 tons; probable reserves, 467,585,900,000 tons with a $P_2O_5$ content of more than 63,651,800,000 tons; an imposing total of 474,758,300,000 tons with a $P_2O_5$ contents in excess of 65,985,200,000 tons. At present rates of consumption (10,000,000 tons of rock probably averaging about 65% B.P.L.) these reserves may be expected to suffice for twenty thousand years. Mansfield's lower estimate promises no shortage within a thousand years.

The United States has long maintained first place among the world's phosphate producers. Marketed production rose from 1,038,551 tons in 1895, when it first exceeded the million mark, to the pre-war peak, in 1913, of 3,111,221. This mark was first exceeded in 1920 with 4,103,982 tons, not since equalled, and since 1925 production has remained greater than three million tons annually, being 3,761,164 in 1929. Despite this increase in quantity this country has not maintained its proportion of the total quantity of phosphate rock mined. U. S. production represented more than 45 per cent of the total in the years from 1900 to 1911. Since 1925 the proportion has not exceeded 40 per cent, having been 36.4 in 1929. This data is for total production only, and does not show the lessening importance of American phosphate rock in world markets. Exports from the United States were surpassed by Tunisian production (all the major producing regions shown on the chart except the United States are unimportant consumers, so that production and exports are practically identical) in 1907.

Curtailed ocean shipping during the World War caused United States exports to fall below those from Algeria in 1916 and below Pacific islands volume in 1917 and 1918 but in the next year the United States had again attained second place. By 1926, the order of ranking had changed to Tunis, Morocco, Algeria, United States, but from 1927 the United States was third, after Tunis and Morocco, as high as it is likely to go. It is more than possible that in the near future



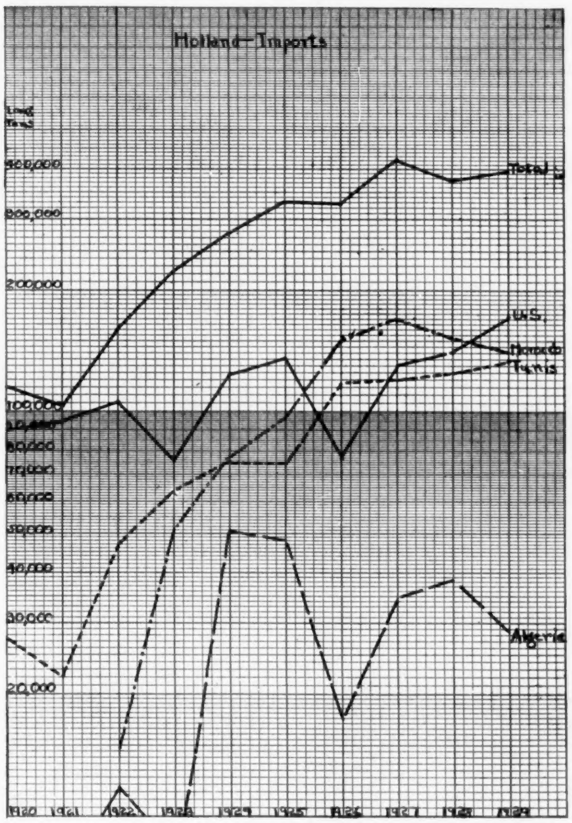

*Spanish import figures show growth of Morocco an important factor*

Morocco will be the first exporting country, with Tunis second.

Faced with keener competition in the European region, American exporters of phosphate rock have sought to develop new markets. Exports to Japan have risen steadily since 1923 to 248,517 tons in 1929, making Japan second only to Germany as a purchaser of American land pebble. Total Japanese imports in 1929 were 559,071 tons, however, the United States

thus supplying about half, while Morocco delivered 39,912 tons and Makatea 61,250. A market to be watched and belonging to the United States by right of proximity is the Canadian, with new superphosphate plants now in operation.

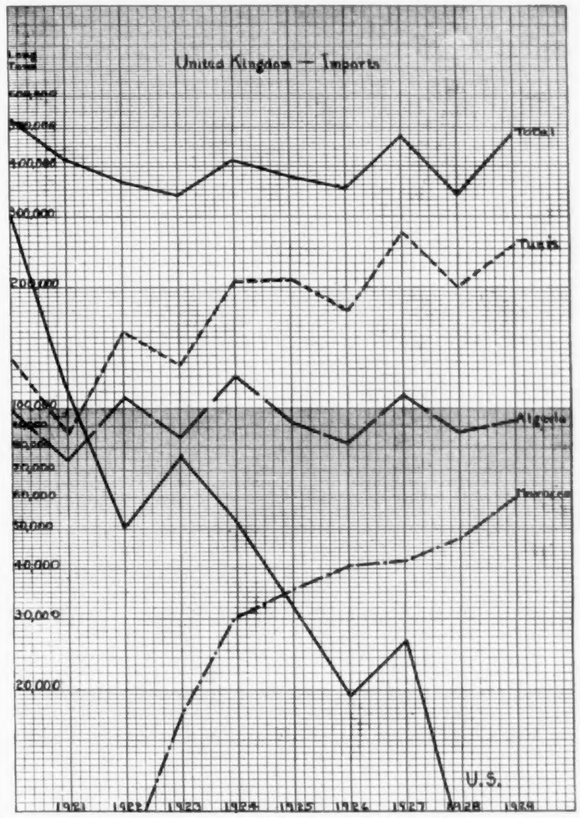
During the war period, of course, but very much since then, domestic consumption alone has given shape and direction to the curve of domestic production. With efforts limited abroad, the home market must be explored and developed to its limit. These markets are, in their present order of magnitude, manufacture of superphosphates, chemical and metallurgical uses, and ground rock for direct application to the soil and stock and poultry feed. Actual volume of superphosphate consumption is completely dependent upon agricultural conditions, fluctuations in which, like the poor, are ever with us. A certain amount of work may be done in educating farmers to increased use of fertilizer; but it seems inevitable that under current conditions, use of fertilizer is considered primarily as a means of increasing output and will enjoy greatest demand in periods of crop shortage.




*United States has maintained its leadership in Holland*

A natural increment of growth is, however, to be expected, as soils become depleted. There is room for additional educational work in the direct use of ground phosphate rock as a fertilizer, but this outlet is likely to be closely tied up with superphosphate consumption and limited thereby.

Increased volume is not the only recourse of fertilizer manufacturers seeking increased profits. Away from the direction of mass production with low, sometimes infinitesimal profit increments, is the rapidly growing tendency towards highly concentrated fertilizers—double and triple superphosphates. High active, soluble phosphate content, partly dependent upon high-test rock and otherwise reached at comparatively small additional cost by reconcentration of phosphoric acid, lessens the disadvantage of the low-




*United Kingdom figures are particularly disappointing*

unit cost product—proportionately high freight rates. Only increased profits can follow expansion of this technical advance. Under present conditions both manufacturer and consumer must pay railroads for haulage, but with concentrated superphosphate (increased fertilizer value per unit weight) lower costs to the farmer and greater profits to the manufacturer will result. Furthermore, at these lower costs, the consuming radius about a given manufacturing center, now limited by freight rates, must inevitably lengthen.

In line with increased profits through increased fabrication is the rising non-agricultural consumption of phosphate products. Trisodium phosphate production, as an example, in 1929 totalled 82,045 short tons, on a basis of anhydrous material equivalent to 100,000 tons of phosphate rock. Here, too, additional fabrication brings considerable extra profit. A further advantage in this type of manufacture lies in its non-agricultural market, diversified markets serving to stabilize income.

Various figures used here have been taken from A. N. Gray's admirable compilation of statistical material "Phosphates and Superphosphates" and official Government sources.

To summarize, American phosphate rock producers hardly dare hope to keep extensive European markets in the face of increasing North African, and particularly Moroccan, competition. New foreign markets may be found elsewhere, as in Japan and possibly Canada. At home, return to prosperity lies less increased agricultural consumption than in the development of concentrated fertilizers, which may increase the general consumption of phosphate rock products, but which will surely increase the margin of profit on these products. Finally, increasing consumption of phosphorus chemicals other than superphosphate will not only increase profit increments but will also give the earnings stability inherent in diversified markets.

## Company Booklets

American Cyanamid, a complete listing of the large number of chemicals produced by the parent company as well as its subsidiaries, Calco, Kalbfleisch, Klipstein, Heller & Merz and Wiarda.

Eastman Kodak, Rochester, N. Y., current issue of "Synthetic Organic Chemicals'" is devoted to furfural derivatives. Also Eastman Organic Chemicals Supplementary Price List.

Grasselli Chemical, has just released a new leaflet describing sodium metasilicate as an industrial cleanser. Copies are available at any of the Grasselli offices.

Hercules Powder, Wilmington, a seven page treatise on the effect of heat and light on introcellulose films.

National Aniline, 40 Rector St., N. Y. City, quarterly issue of "Dyestuffs" contains several valuable articles for the dyer including "Leather Dyeing with ph Control Colors" by H. C. Merrill.

Philadelphia Quartz Co., Philadelphia, has just released a 13 page booklet describing the use of sodium metasilicate for cleansing purposes in the electroplating industries, by W. L. Pinner.

Roessler & Hasslacher, Empire State, N. Y. City, October edition of the quarterly price list.

Roessler & Hasslacher, Sixth edition, Heat Treatment of Steels with Cyanides and Salts, greatly enlarged with new subject matter on use of molten cyanide baths for the lower temperature nitriding of special alloy steels; data on cyanide baths, "Case" Composition, cyanide reheat, mottling; localized hardening.

Rossville Commercial Alcohol, Lawrenceburg, Ind., "Alcohol and the Artificial Leather Industry".

Foster D. Snell, Inc., 130 Clinton St., Brooklyn, has just published, "The Consulting Chemist and Your Business," fifteen page booklet describing the relationship between the consulting chemist and the manufacturer, stressing the many ways such service is a distinct advantage.

### World Platinum Agreement

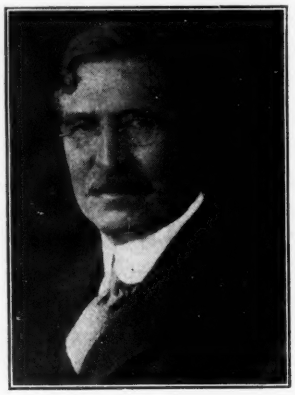
A world platinum agreement is reached in London October 21. The accord, results from a new English company, Consolidated Platinums, Ltd., having concluded contracts to buy and resell virtually all the new platinum production originating in Russia, Canada, South Africa and Columbia, constituting the major portion of the world's output of this precious metal.

Principal producers of raw asbestos in Soviet Russia and Rhodesia collaborate with main European consumers, with view to stabilizing the market on a basis satisfying to all.

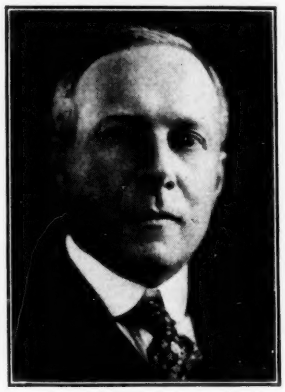
## We Congratulate

**Charles L. Reese—November 4, 1862; August Merz—November 7, 1873; James Garrett Vail—November 16, 1886**

The *beau ideal* of a chemical executive—a sound chemist who is at once a wise judge of markets and of men—appears so infrequently among the administrators of our chemical affairs that he is of necessity as conspicuous as the proverbial white blackbird. Such men achieve a conspicuous personal success. They make a lasting mark upon the industry, not only in accomplishment; but also in inspiration. Of this very select company is Charles Lee Reese. He was chief chemist among that small group of far-sighted executives that brought the Du Pont companies from explosives into their present wide chemical interests. More broadly he has given all American industry high ideals of applied research and the practical technique of research organization. No austere automaton, his friendly and enthusiastic spirit has exercised great influence upon chemical developments.

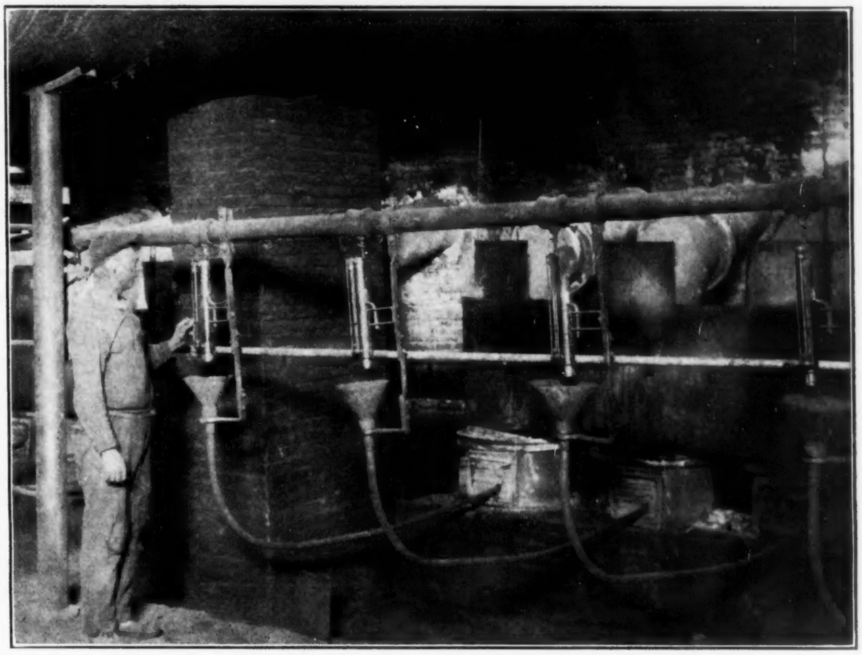


When the full history of the American coal-tar chemical industry is written no name will occupy a more prominent place than that of August Merz. Born into one of our two important pre-war dye-making families he was trained for his career at Cornell and Heidelberg and from chemist to plant manager had worked his way up to an important place at the time of the War. His expert knowledge was freely used by the War Industries Board and the Textile Alliance; but it was during the bitter political and economic reconstruction period that he rendered most distinguished service through the Synthetic Organic Chemical Manufacturers' Association, first as chairman and later as president. We must condone the industry if he does not continue active in its councils.



James Garret Vail appeals to our sense of proportion. He is a most conspicuous example of the thoroughgoing chemical specialist, yet he rides three very differently gaited hobby-horses hard and skillfully. Since he completed his chemical schooling at Pennsylvania, Harvard, and Darmstadt he has worked for a single company which produces a single small group of chemical products, and more than any single man is responsible for the many uses that modern arts and industries have made of the various silicates of soda. But he is also an expert in two branches of ichthyology, in bibliography, and in photography. He married in 1910; did relief work in Germany in 1920; in 1930, was Chemical Director and Secretary, Philadelphia Quartz Co., in 1940 may the "best yet" come to him.

# Science Applied to an Ancient Art



*Type of furnaces in which the finer grades of lampblack are produced*

**By Luther Martin IV***

THE Magdalenian man who painted shaggy bison, slim deer, and lumbering boars on the ceiling of the cave of Altamira in Northern Spain some two hundred and fifty centuries ago, left something of far greater value than a jawbone to the historian of lampblack. Although the pigment may have been used long before these paintings were made, the clear black outlines, eyes, and hoofs of his painted animals constitute the earliest known record of its use.

It seems curious that a commodity of such unquestioned importance in modern industry should have been familiar to paleolithic man. But the evidence remains. Analysis proves that the pigment that has withstood the assault of 25,000 years is an authentic if crude lampblack, produced over a little fire by prehistoric man and laboriously mixed into paint for the decoration of his dark hideaway. Evidences of this sort,—and fortunate it is for the student of antiquity, some of whose finest records of early men would have been destroyed had a less permanent agent than lampblack been used,—have cropped up in many different parts of the world to prove that the knowledge of lampblack manufacture was ancient and wide-spread.

From the crude black of the caveman's making to a finer black used in the manufacture of ink is a jump of many centuries. Somewhere two to four thousand years before the Christian era, however, man chose to write, and ink, made by many methods with lampblack as a base, met his new requirements. It is not certain where the discovery originated, for while the Chinese have the best records of the use of lampblack in ink-making, the early Egyptians also used it in their inks, and Jesuit writers have attributed its discovery to the Koreans. The ancient Hebrews are known to have used a mixture of lampblack, water and gum, which was called "deyo" because of its blackness. The Arabians had a more complex system. They burned oil, tar or resin to get blacks which they mixed with gum and honey. The substance was then pressed into wafers to which water was added when the ink was needed.

The Chinese, however, were probably the most prolific makers of lampblack in ancient times. By 2600 B. C., they were using a black lacquer which was deposited with bamboo sticks. About 1200 B. C., they developed a fine India ink, using the soot produced by the smoke of pines and the oil in lamps mixed with gelatin from asses' skins, and musk to counteract the odor of the oil. This ink was primarily for the purpose of blackening the surface of raised hieroglyphics, and in this connection, Emperor Wu-Wong gave a charming testimonial of the enduring quality of lampblack. He wrote (1120 B. C.): "As the ME (a word signifying blacking in the Chinese language) which is used to blacken the engraved characters, can never become white; so a heart

*Secretary, Wilckes, Martin, Wilckes, Swann Corp. Subsidiary

blackened by vices will always retain its blackness." From Chen-Ki-Souen, historian of ink-making by the Chinese, we learn that during the third epoch of ink, the province of Kiang-Si was given an ink monopole by the Emperor, the sole privilege of manufacture throughout China, and a special functionary was sent to supervise its making.

Chi-Ting-Kouer was the most celebrated ink maker when China excelled in ink manufacturing. The ink which he made, based on lampblack, was so superior that a title was conferred upon him by imperial decree as a recompense for the service which he rendered indirectly to literature. No one could equal his product, made by secret processes, and after his death ink-making became less of an art and more of an industry.

### Resourcefulness of the Chinese

The Chinese showed great ingenuity in the making of lampblack. Recourse was had to almost all combustible materials, among them rice powder from which the Emperor Hsiuan-Tsong had manufactured the ink he used. Oily substances of all kinds were used, particularly che-yeon (coal oil) in lamps, which made a very brilliant black for surpassing that made from pine wood. It is interesting to note that one maker used the bark of the pomegranate tree for his blacks, and Li-Ting II even used rhinoceros hoofs. Chen-Ki-Souen has preserved for us an actual formula for the manufacture of lampblack. We learn from him that the best seasons for manufacture are at the end of autumn and the beginning of winter. He says that during the summer, the products obtained are yellow, but that if care is taken to diminish the thickness of the lamp wicks and to pour fresh water into the evaporators at frequent intervals, a beautiful black may be obtained during the summer. The day must be calm, however, and the evaporators placed in a well-lighted, tightly closed chamber. The Chinese lampblack makers usually hung their walls with draperies to keep the fine black from blowing away, and access to the chamber was gained only through a little door covered with a curtain of paper.

The evaporators were filled with water and about eight feunnes (three grams) of oil were poured into the lamps. It was necessary to eliminate all draughts for without this precaution, the smoke dispersed and gave very little black. The cones were changed from hour to hour and the wicks turned up. The yield was eight catties of very pure black from a hundred catties of oil (a catty being equal to one and a third pounds).

Although more than 3,000 years have passed, Chinese methods of production have defied time. While neither the yield nor the quality is satisfactory, the Chinese lampblack maker continues to ignite a resinous substance in a pot which is left in a closed room to burn itself out through lack of proper air supply.

Pliny, Vitruvius and Theophrastes give much interesting information concerning the use of lampblack, particularly for painting buildings, in the chemical world. Modern searchers, digging about in Greek and Roman ruins, have found all sorts of corroborative material. Sir Humphrey Davy, celebrated English chemist, asserts that had it not been for the use of lampblack, nothing would remain to read on the papyri dug up from the ruins of Herculaneum and Pompeii. He states, after analyzing bits of black paint scraped from fragments of stucco, that it is possible the Romans used the dregs of wine or ordinary soot in making their lampblack.

With the invention of the printing press, the manufacture of lampblack was for the first time put on a commercial basis. While the first lampblack used in printing ink was crude, a highly efficient system of manufacture soon developed in Germany and later introduced to America.

A man by the name of Fox was America's first lampblack manufacturer. His factory was established in Germantown, Pa., in 1775, and named his product "Germantown," a title still retained by American manufacturers for a certain grade. So far as can be learned, no other lampblack factory was established in the United States until 1848, when William R. Jaeger built a plant in the Fairmont section of Philadelphia. This factory was sold to Luther Martin, whose two sons and grandson, Luther Martin 3rd later joined the company.

Through August Wiegland & Company, German producers exporting to the United States, a greatly improved method for the manufacture of lampblack was ultimately brought to this country. The August Wiegland Company was represented here by Frederick and Felix Wilckes, who formed a company known as Weigland & Wilckes. A breach occurred, and the Wilckes Brothers built a plant at Camden, N. J. Luther Martin 3rd, who had, by that time, left the L. Martin Company, joined in this venture. The new company was called "The Luther Martin and Wilckes Company" until its final change to "Wilckes, Martin, Wilckes Company."

### Few Fundamental Changes

Although a number of changes in equipment have been made, the principle of lampblack manufacture has varied little since the introduction of the improved German method in 1888. Fundamentally, it is a process of incomplete combustion of coal-tar oils, sometimes designated as "dead" or "creosote" oils, and a collection of the carbon thus formed in brick chambers. The furnace consists essentially of upright iron jackets connected to flues leading into the chambers.

A single lampblack unit consists of one extra strong brick building measuring 250 feet long, 60 feet wide,

and 30 feet high. The walls of this building are over 24 inches in thickness to safeguard against "blow-outs." At one end of the building are located the pots, troughs and retorts, which vary according to the type of black being produced in the unit. In the same section are located the oil, air, steam and water lines and a special compartment for the operator who watches the fires through a peep-hole containing a steel shutter, which falls in place when an explosion takes place. In the operator's compartment are the air, oil, water and steam controls and a pyrometer dial. The black is conveyed from the burning equipment by means of large pipes which open into the wall of the settling chamber.

The settling chamber is divided by many stone baffle walls which force the gases and the black to take a circuitous route to the blowhouse which is a long narrow underground tunnel. Before the gases reach the blowhouse, most of the lampblack has settled out. Remaining particles are recovered in the blowhouse or leave the stack with the gases.

The fires are started each morning and burn continuously for a period of twelve to seventeen hours under the eye of the operator. It is his duty to maintain free and open feed lines, sufficient draught, correct temperature, and an evenly-burning fire. He must also prevent the accumulation of gases in the collection chamber, and although the condition of the fires will indicate such accumulation to an experienced operator, pressure gauges have been installed as an added protection to life and property.

If the flash point of an oil varies slightly from specifications, or the oil contains too much water, the operator must be exceptionally careful, as these two factors have caused terrible explosions. A thirty foot wall has been known to split open like a hot biscuit, due to the confinement and ignition of unburnt gases. Serious accidents do not happen, however, if everyone from the chemist in the laboratory to the operating man is careful when testing and handling materials.

### Production of Higher Grades

Twelve to seventeen hours after the fires are started, they are put out and the house is allowed to cool. A number of men then enter the collecting chamber and draw out the black with wooden scrapers into the pack house where the material is compressed and packed into paper sacks. These packages are then put into dustless fibre cases, sealed and stored.

Small furnaces, arranged in banks connected to a single catch chamber, are used for the production of a high grade black. The products of combustion are carried to the chambers by flues of the same diameter as the furnace. The combustion is carried on in cast iron circular "pans", or "pots", the oil being fed by gravity and allowed to drip on the upper surface of the pan. The flow is regulated by petcocks leading to open funnels on the top of the feed pipes. Air for combustion, regulated by changing the opening beneath the pan or altering the amount of draught through the settling chamber, enters in the space below.

## *The Industry's Bookshelf*

**A Text-Book of Inorganic Chemistry,** by James Riddick Partington, 1091 pages, published by Macmillan, N. Y., $4.80.

A textbook primarily intended for students who have completed an introductory course, yet the treatment is elementary. The method of presentation is to some extent historical and is largely experimental. Contains a most complete appendix of questions.

**Analysis of Leather and Materials Used in Making It,** by John Arthus Wilson and Henry Baldwin Merrill, 512 pages, published by McGraw-Hill Book Co. Inc., N. Y., $7.00.

A very complete work on the most satisfactory methods of analysis and testing of leather and all of the more important materials employed in making leather. Fills a long felt need in the leather chemistry field.

**Science in Action,** by Weidlein and Hamor, $3.00, 310 pages, published by McGraw-Hill Book Co. Inc., N. Y.

A popular treatise on the value of scientific research and an account of several of the more important advances in industrial processes made in the past ten or fifteen years through the intelligent coordination of scientific and business research.

**Elements of General Chemistry,** by Babor, Estabrooke, Lehrman, $3.75, 601 pages, published by Thomas Y. Crowell Co., N. Y.

Designed for beginners in general college chemistry yet sufficiently flexible to serve as a text also for students who have had high school chemistry. References to industrial applications are omitted as the authors suggest supplementing the book with a comprehensive series of lectures stressing the practical side of chemistry by slides, etc.

**Laboratory Manual in Elements of General Chemistry,** by Babor, Estabrooke and Lehrman, $2.00, 419 pages, published by Thomas Y. Crowell Co., N. Y.

Prepared to accompany "Elements of General Chemistry" by the same authors. Specially valuable for the very practical laboratory viewpoint without sacrificing the proper and necessary training in fundamental scientific theory.

**Economic Science and the Common Welfare,** by Harry Gunnison Grown, 472 pages, published by Lucas Bros., Columbia, Mo.

Fifth edition is revised and enlarged from previous editions and issued at a specially timely moment when the major part of each day's news is filled with the startling occurences in the financial and economic international structure. A detailed survey of the multitude of various economic factors that together form the very complex existence that we have reared. Prices, price levels and trade; interest, wages and rent; monopolies, money structure, depression banking and tariffs are but some of the debatable economic subjects treated in a commendable, fair and open-minded manner.

### Tin Production Curtailed

Malayan tin production during the next four months will be reduced at the rate of about 2,000 long tons monthly, in order to bring the country's output down to its quota allowance under the international curtailment plan and to offset its recent excess production.


*Although prices declined during 1931 the level is still higher than that prevailing in 1921*

# Mercury

By

**Charles S. Wehrly**

**Manager Chemical Department, Henry W. Peabody & Co.**

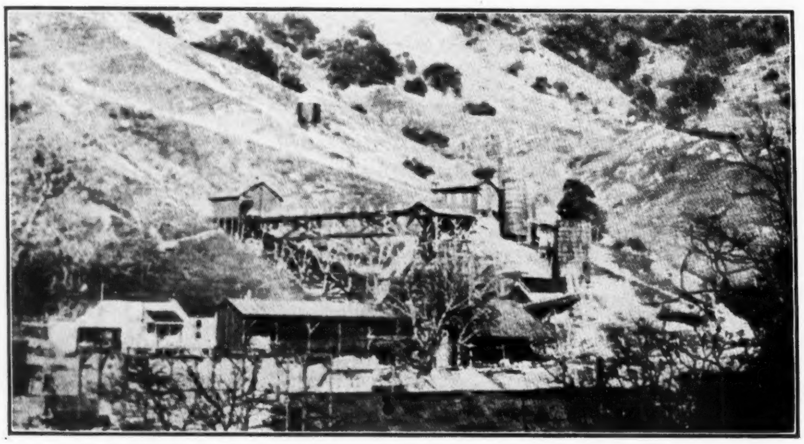
FROM October 1928 to June 1931 the Mercurio Europeo was able to maintain with but little fluctuation a constant price for mercury. The value of that control is now becoming a doubtful asset. Political conditions surrounding production both in Spain and Italy have worked to maintain past productions, and with a general decline in business activity, consumption has fallen so that the so-called Trust now finds itself with growing stocks and shrinking outlet.

Financial pressure, more than the possibility of larger sales, probably forced the first major decline in the Trust price on June 1st of this year to £16,15-0; a drop of £4. With present stocks, the upset political condition in Spain, the world-wide decline in commodity prices and consumption, the growing distrust amongst the members of the Trust, and the urgent need for revising the entire financial structure of the Mercurio, it is not hard to believe that we will soon have a "free" market in this commodity.

About 300 years ago the Spanish Government assumed control of the Almaden Mines. It was the old Spanish custom to sell their production upon a ten year agreement for the entire output. So repeatedly was this agreement—of late years—awarded to the Rothschilds of London that their name was synonymous with Spanish mercury, although the terms of these transactions did vary, the last, in effect from January 1911 to December 1921, gave the buyer the output at approximately £7 per flask upon which a sales commission of ¾% was allowed. When the selling price exceeded £8 an additional 5% was granted. All incidental charges of transportation, insurance and storage were assumed by Spain. Naturally, during the last period when—mercury sold during the four years of 1917-1918-1919 and 1920 at an average of over £20—the return to the Rothschilds was rather handsome. During this period they sold 297,451 flasks.

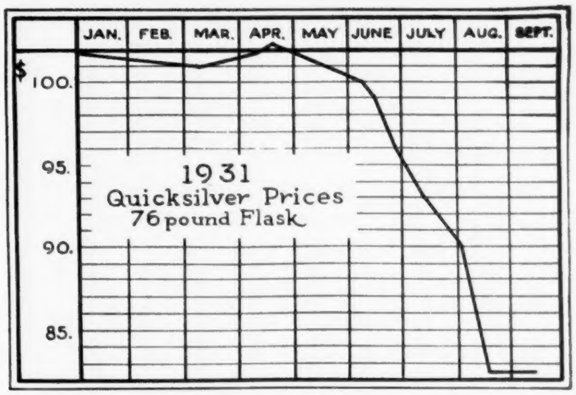
Only naturally the loss of such profit to Spain caused some effort to readjust matters and for the next three years direct sales were made by the Government. As usual with any political dabbling in business, this method was also found unworkable—so badly so, that one of the large buyers at that time has never recovered the entire cumulative discount offered. In 1926 the Sociedade Generale de Mercurio de Madrid —financed by the Banco de Credite of Madrid—was formed. This lasted but two years, and conditions were ripe at that time for the persuasion of the Italians to overcome the caution of the Spaniards and the Trust was formed.

Italy's mercury experience had been a little different as it was only after 1918 that she became a prominent factor. The addition of the Idria



*Domestic production is now such that it constitutes a real threat to the Italo-Spanish Cartel*

# Markets




*With buying seriously curtailed, producers were forced to lower prices on October 21, a price of $74 being reported*

group placed her in a superior position to Austria, from whom these mines were obtained as a result of the war. This group with the Monte Amiata mines account for most of Italy's production, but unlike Spain there are three or four small independents. In 1924 Amiata came under the control of the Banca Commerciale Italiana of Milan and thus with the Government owning Idria we find the respective Spanish and Italian authorities controlling a combined total of over 90% of the world's production.

Natural bickering for world trade caused many overtures by both the Spaniards and the Italians to each other towards the formation of a concerted movement for stabilization of price, or in other words a monopolistic control. With healthy business there was no real need of outside assistance, but the really feeble man was able to confuse the strong and in October 1928 the Italian group prevailed over the logical domination of Spain and together they formed the Mercurio Europeo. Although Italy for several years had produced more tonnage than Spain yet its ore, averaging but from ½% to 1½%, presented no serious competition to Spain where with an operative loss of over 25% a yield of at least 6% is obtained. Figures presented gave a cost of production higher in Spain than in Italy, but actually these figures meant little as both were ridiculously incorrect.

This Trust operates through a general committee of ten—five for each country. It has its headquarters in Switzerland. The Spanish group is represented by three parties from the Council of the Almaden, a naval officer, and a nominee of the Minister of Finance. As a gesture to Spain's position it was agreed that sales should be prorated 55% to Spain and 45% to Italy. A penalty of 10% was attached to any sale made by either party at less than official quotations (home consumption excluded). Prices opened in 1928 at £21-15-0 and held to within £1 of that figure until June of this year when a reduction was made to £16-15-0. It is difficult accurately to appraise what might have been the value of such a trust under normal conditions, but if we take the fiscal year of October 1928 to October 1929, the actual sales (not agents' commitments) were decidedly under the combined sales of the previous year. At the end of the first year of operation the Trust held between 120,000 and 130,000 flasks in stock.

Instead of adopting a sane attitude toward these mounting stocks Almaden in 1928 produced 60,183 flasks and in 1929, 72,648. In explanation, the Italian Government had refused to reduce its working schedule because of promises given by the Government to labor, and Spain likewise under a watchful federal eye hesitated to reduce its output disproportionately.

*Oldest Spanish refinery in operation. Methods of production have changed slightly in several years*

How the bankers or the Mercurio expected or expects to continue production in excess of consumption and maintain an artificial price in which two widely diversified costs operate, is a problem whose solution is beyond the best minds of other cartel managers who have found the path of controlled prices a difficult one to tread. The actual cost of production in Spain—stripped of superfluous charges—is somewhere between £3 and £4 per flask. It is needless to say that Italy with an ore but a fifth as rich as Spain's must have a much higher cost.

During this past summer some of the Trust's foreign agents offered material at from £15-8-0 to £15-12-0 per flask when the official price was £16-15-0 —an act which was excused by the Trust upon the basis of Mexican competition. In September the price was dropped to £15-8-6 but with a decline in Sterling, was raised again to £17-10-0 and at the time of writing we are unofficially informed is quoted at £21-0-0.

### War Curtailed U. S. Production

Until 1920 the control of the world's price for mercury did not rest with Spain, as the United States exported in that year 9,107 flasks. The war and its aftermath interjected factors which prohibit the use of data prior to that time, but in 1921 prices broke badly and instead of the 13,392 flasks produced in 1920, the United States furnished only 6,339 flasks. In all annual data considered it is only proper to cover a period of at least two years. Foreign control then became definite. Exports dropped to a negligible figure; imports increased and the import duty which was raised from 10% ad valorem—the rate applying from 1913 to 1922—to 25c per pound or about $19.15 per flask (including the duty on the container) did not act as a barrier. Domestic production lagged until 1928 when under the stimulus of a price over $120.00 we made 17,870 flasks. Imports did fall off somewhat but that year 14,562 flasks entered our ports. For the five years, 1925 to 1929, our apparent consumption was over 30,000 flasks. In 1929 with prices still over $120.00 we produced over 23,000 flasks, a figure which dropped to 21,553 in 1930. Imports in 1929 were 14,917 and in 1930, 3,725 flasks—but not a single flask was purchased for import during 1930; the imports represent contracts placed in 1929 when domestic consumers were afraid of this country's ability to produce.

The number of American productive mines increased rapidly during the years of 1928, 1929 and 1930. Mercury was a profitable item even out of ore which averaged less than ½%.

Much has been written about the cost of production in this country and it is impossible to give an accurate estimate which can generally apply, but a well run mine whose past production has permitted amortization of at least part of its equipment and whose ore reserves show a possibility of further operation should not have a higher cost than from $50 to $60 per flask.

A number of inferences can be drawn. Consumption does not fluctuate with price—instead we find creasing uses where mercury is irreplacable. Tariff has little to do with the promotion of a domestic industry—and if we again approach a level of $50.00 the Government would do well to reconsider a reduction in duty as mercury is still indispensable in war. Conditions both political and economical strongly point to either an entire reformation of the Trust with consequent lower prices or its dissolution. The domestic producers have enjoyed five years of prosperity with increased production and prices. This increased production has resulted not so much from increases in the output of the older mines but by the reopening of numerous smaller mines. These so-called marginal producers with an output of but a few flasks per month have been the cause of the recent ridiculous situation wherein domestic prices have fallen to about $80.00 or at least $5.00 under the import price solely because these producers are financially unable to properly merchandise their material.

Granted a 40% reduction in consumption it is certain that our output does not exceed our present demand. Why then does the domestic industry penalize itself and endeavor to exhaust our meager resource ?

The future is indefinite—too many factors enter into any calculation to make it of value. Certainly there are large stocks abroad. Certain it is that consumption has declined. It is true that domestic production will decrease. The situation thus resolves itself into a race between the ability of the Trust to hold together and the United States to produce its needs. If the Trust breaks we shall see a closing of many mines here and a renewal of imports. If finances or sales outside of this country permit the Trust to continue then prices will hold until the gradual pressure to liquidate those Trust stocks causes a leveling of markets to a point where the natural supremacy of Spain will again predominate.

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The Soviet is determined to increase production of soda ash. The President of the Supreme Industrial Council of the U. S. S. R. has ordered the "Wsechimprom" to commence the immediate erection in Slawjansk of a large new alkali works, with an initial output capacity of 210,000 tons of soda ash a year. The new plant is to be ready for starting up on January 1, 1933. Steps are to be taken without delay for increasing its output capacity to 400,000 tons of soda a year. In addition, the "Wsechimgrom" is instructed to commence the immediate erection of an alkali works in Beresniki (Urals), to have an annual production capacity of 400,000 tons of ash.

The United Chemical Industry completed a dozen plants during the half-year. Among the most important of these is the power plant at the Khibini apatite (phosphate) works, the cost of construction of which was 4,000,000 rubles. The Voskresensk factory near Moscow, which manufactures superphosphates, was also constructed at a cost of 1,800,000 rubles.

# CHEMICAL

## *Photographic Record*

*Ohman and Arden, radio's best known piano team assisted by a different guest artist each week help to remind the Nation over a coast to coast hook-up that Pyro, U. S. Industrial Alcohol anti-freeze, should be in every radiator*

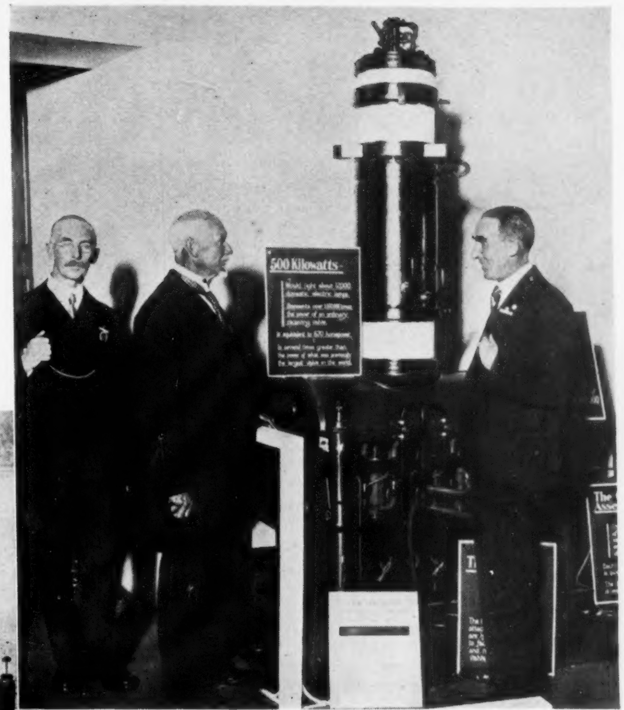
*Helium, not many years ago a laboratory curiosity, is now produced at the U. S. Government's plant at Amarillo, Texas, in the large quantities necessary to lift the Akron, latest giant ship of the air. Photograph shows helium tanks used to inflate the huge bag at Akron*

*Courtesy, Manufacturers' Record*

*Eastman Kodak opens its $1,000,000 acetate yarn mill at Kingsport, Tenn. Oldest manufacturer in this country of cellulose acetate it will now convert part of its output into acetate yarn*

# NEWS REEL

## *of Chemical Activities*



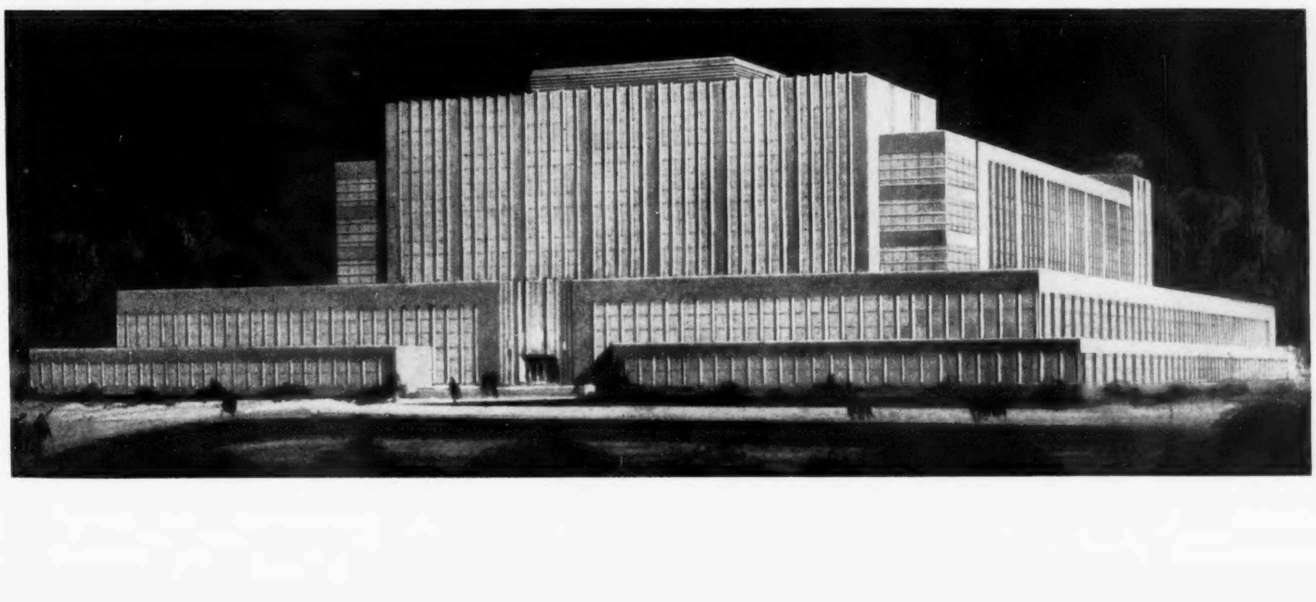

*General Smuts opens the Faraday Centenary Exhibition. South African hero inspects the world's largest wireless valve on view at Albert Hall, London. Other exhibits stress the importance of Faraday's discovery of*

*benzene and its importance to the development of the modern dyestuffs industry. Above, Michael Faraday at work in his original laboratory. Famous painting vividly portrays the crude equipment available to the earlier pioneers*

*Courtesy, Phila. Quartz Co.*

*Series of murals adorning the walls of a workman's dining hall in a large German factory illustrating the development of washing throughout the world and done entirely in silicate paints*

*New Forest Products Laboratory building being erected at Madison, Wis., which will be the largest establishment devoted to research on wood and related products. Building will be 175 feet long, six stories in height, with total floor space of 175,000 square feet*





# Canada's Chemical Progress

By S. J. Cook*

CANADIAN chemical developments impress one with the faith of the Dominion's industrial leaders in the soundness of this industry as an investment. Their confidence is revealed in the marked expansion of existing plants, the construction of new works, and the prosecution of intensive research programs looking to the elimination of unprofitable factors in trade or to the creation of new products, or again to the development of new markets for known products.

Reflecting the sound judgment of the business leaders, governments, provincial and federal, with seldom a dissenting voice, have voted increasingly large appropriations for research in pure and applied science and for statistical studies, that seemed likely to be of value in interpreting laboratory results.

### Position Strengthened by Mergers

Consolidations of ownership have brought numerous plants, making varied products, into financially able hands and under the direction of representative boards whose personnel bring to the administration of company affairs not only knowledge of production and management, but as well, a highly developed appreciation of sales promotion and market studies.

A few official figures may be used to point the argument and to serve as the basis of further discussion. Limiting the comparison to those industries classified under the heading "Chemicals and Allied Products", and to the five-year span, 1926-1930, shows in rather striking fashion the advances made. Invested capital has risen from 133 to 170 millions, a gain of 28 per cent. The numbers of employees have increased steadily to a total of more than 15,000 persons. Raw materials that in 1926 cost 46 millions advanced to 49 millions in 1930, but the selling value of products in the same years showed a much more marked increase from 108 millions to 122 millions. Depressed prices tended to reduce figures for value in 1930. Higher totals both in costs of materials and in total selling values were reported in 1929, as may be seen in Table I.

*National Research Council, Ottawa, Canada.

**Table I**

**Chemicals and Allied Products, Canada 1926-1930**

| *Year* | *No. of Plants* | *Capital Employed* | *Cost of Materials* | *Value of Products* |
|---|---|---|---|---|
| 1926 | 556 | $133,407,891 | $46,124,557 | $108,500,933 |
| 1927 | 561 | 134,618,839 | 47,765,066 | 111,447,612 |
| 1928 | 572 | 148,939,920 | 50,934,391 | 123,677,860 |
| 1929 | 557 | 165,886,912 | 55,184,337 | 138,545,221 |
| 1930 | 590 | 169,982,605 | 49,013,269 | 122,266,852 |

Much strength of Canada's chemical industry comes from the fact that by far the greater part of the output is absorbed in the domestic market. While the annual production reached a value of 122 millions in 1930, 106 millions of chemical products made in Canada were used in Canada.

But in the same year Canada purchased foreign chemicals to a value of nearly 37 millions, including nine main items each of which showed a declared value in excess of one million dollars; twelve other items were each above the half-million dollar mark. In the five-year period, 1926-1930, the values of chemicals imported into Canada were as follows: 1926, $31,358,384; 1927, $33,313,500; 1928, $36,963,694; 1929, $40,131,178; 1930, $36,785,050.

Computing consumption data as the sum of imports and of domestic production not exported, the interesting fact appears that Canada supplies only 74 per cent of her own requirements in chemicals and allied products. The extent of the Dominion's dependence on other countries has amounted in each

of the past five years, with surprising steadiness, to about 26 per cent of the total consumption values, as shown in the following table:

**Table II**

**Comparison of Canadian Production, Imports, Exports and Consumption Values for Chemicals and Allied Products**

*1926-1930*
*(In millions of dollars)*

| | *1926* | *1927* | *1928* | *1929* | *1930* |
|---|---|---|---|---|---|
| (a) Production | 108.5 | 111.4 | 123.6 | 138.5 | 122.2 |
| (b Less: exports | 16.4 | 17.2 | 18.3 | 21.8 | 16.3 |
| (c) Difference (Domestic sales on Canadian goods) | 92.1 | 94.2 | 105.3 | 116.7 | 105.9 |
| (d) Add: imports | 31.3 | 33.3 | 36.9 | 40.1 | 36.7 |
| (e) Apparent consumpt. | 123.4 | 127.5 | 142.2 | 156.8 | 142.6 |
| Percentage of imports to total consumption $\frac{(d)}{(e)}$ | 25.4% | 26.1% | 26.0% | 25.6% | 25.7% |

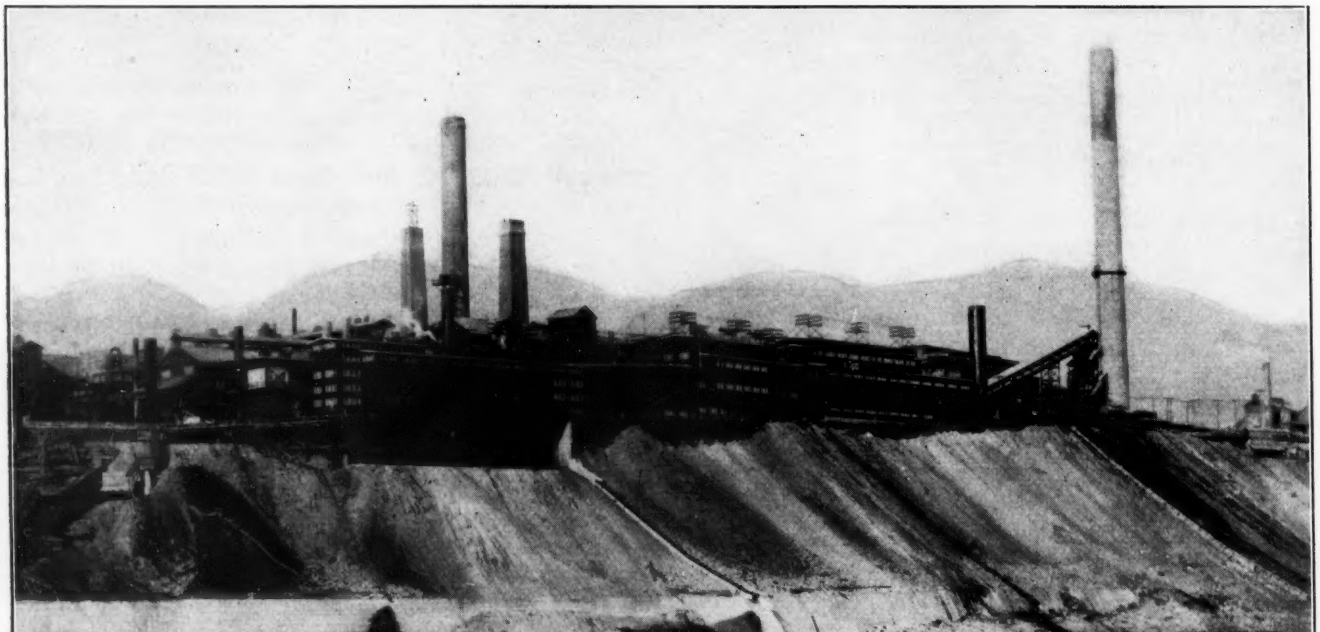
As noted in an earlier paragraph, the past two or three years have witnessed unprecedented expansion in the Canadian chemical field. This means that, in large measure, the construction of new units in recent years, was due primarily to recognition of the fact that when basic fabricating industries are greatly enlarged, the consumption of process materials is also likely to be considerably increased. Careful economic studies indicated that important savings could be effected through the building and operation of these subsidiary plants and that the whole financial structure of the participating companies was likely to be improved through this diversification of output and the resulting growth of trade.

A few examples may be cited.

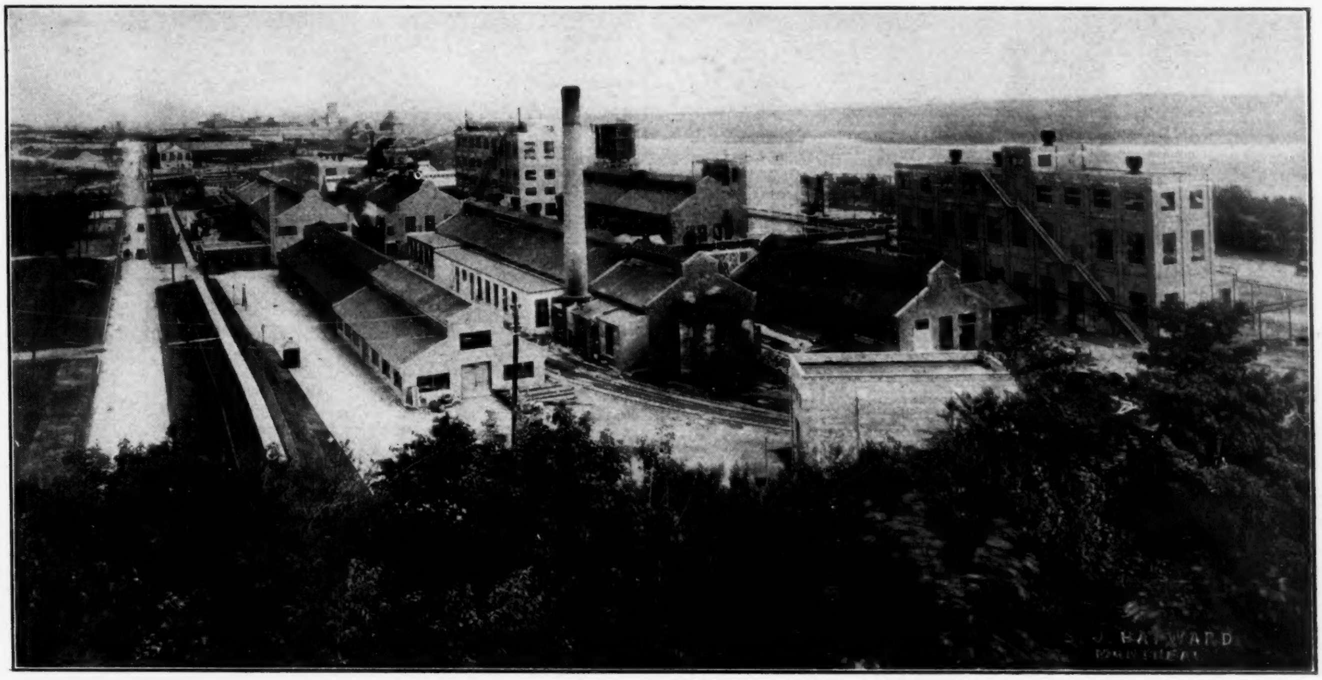
In western Canada the progress of the Consolidated Mining & Smelting Company at Trail, B. C., traceable in large measure to the activities of the excellent research department under the stimulating leadership of the Company's general manager, has been almost phenomenal. While the Trail smelter was built in 1895 to treat the gold-copper ores of Rossland Camp, it was not until the Company's research department developed a satisfactory method for the treatment of the complex ores of the famous Sullivan mine that the works attained anything of their present-day importance. With the establishment in 1916 of the electrolytic zinc plant, the Company entered on a wonderful period of development, Trail is now one of the world's largest non-ferrous metallurgical plants.

Sulfur fumes from the Trail smelter increased in volume, and blown by prevailing winds crossed the border into Stevens County, Washington, causing damage, so that protests were raised and official intervention followed.

After a prolonged investigation of the problem, the International Joint Commission recommended that the company should be required to compensate the property owners to the extent of $350,000 and to reduce the volume of sulfur fumes from their smelter to such a point that no further damage will be done. This recommendation has been reported to the governments of the United States and Canada for ratification but a final decision has not yet been reached.



*Tadanac Smelter, commonly known as the Trail Smelter, with new slag fuming plant in foreground, on bank of Columbia River, British Columbia*




*Latest bird's-eye picture of Shawinigan Chemicals, Ltd., Shawinigan Falls, Quebec, large synthetic acetic acid producer as well as manufacturer of a large list of other important chemicals*

To solve this problem, the Company undertook to recover the sulfur in the fumes as sulfuric acid, and as the market for acid in that part of Canada was small, it was decided to engage in the manufacture of superphosphate fertilizer. Trial shipments of superphosphate were sent to the prairies, but it was soon found that for growing grain the soils of the prairies need nitrogen and potash as well as phosphoric acid, and that therefore the superphosphate fertilizer alone would not be likely to find a ready or continuous sale. Appreciating that half measures were not likely to succeed, the Company decided to erect plants for the manufacture of synthetic ammonia. The first section of the first unit, consisting of the manufacture of what is known to the trade as "triple superphosphate" and "mono-ammonium phosphate," was put into operation at Warfield toward the end of 1930. Construction has been continued on the plants for the manufacture of hydrogen, nitrogen and ammonia, and before the end of the present year it is expected that these new departments will be complete and ready to produce at the rate of 400 tons of fertilizer daily.

For a time at any rate the Company will import high-grade phosphate of lime from deposits in Utah and Montana, but work will be continued on the Company's own low-grade deposits of phosphate rock situated near Fernie and also at the Crowsnest near the Alberta boundary to assure the continued life of the fertilizer plant, if for any reason the imported article should cease to be available.

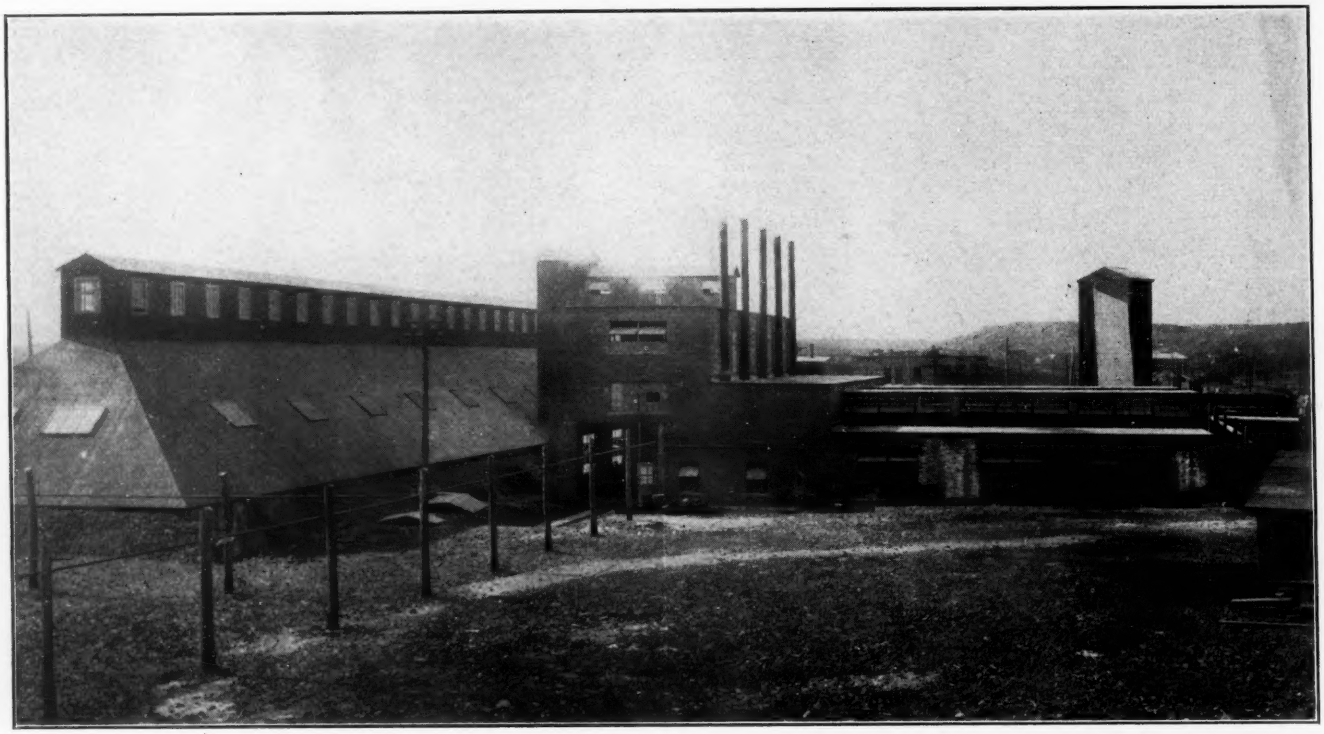
Another development at Trail of more than ordinary interest was the construction last year of a lead-furnace-slag re-treatment plant that is now producing upwards of 100 tons of pure zinc daily from old slags that were discarded from the lead furnace department in earlier years. In the development of this process the Company's research department worked in cooperation with metallurgists of the Anaconda Copper Mining Company, which has erected a somewhat similar plant. The process is comparatively simple. Briefly, it consists of blowing coal dust into the molten slag, reducing the zinc to metal, volatilizing, reoxidizing, cooling and collecting the zinc in bag houses. The fume is dissolved in sulfuric acid and the zinc is recovered by the electrolytic process.

Construction of these new plants has added nearly $15,000,000 to the Company's investment in the vicinity of Trail.

Production of chemicals in Canada is centered to a large extent in Ontario and Quebec. In 1930 there were 312 plants located in Ontario having a total output valued at $71,353,476, while in Quebec there were 175 plants reporting an output valued at $38,083,773.

One interesting development in the chemical industry of Canada is the consolidation of companies now known as Canadian Industries, Limited. Originally known as Canadian Explosives, Limited, (itself a merger of a number of small independent powder companies), the parent organization has extended along logical lines to one of the most important factors in Canada's chemical trade.

When black powder gave way to nitro-glycerin products, sulfuric and nitric acids for nitration, became necessities in the explosives industry. Similarly, nitrocellulose, a necessity in the production of gelatinized explosives, created a demand for large quantities of ammonia. Nitrocellulose lacquers, provided a connection with the paint and varnish industry, and the manufacture of nitrocellulose plastics offered another outlet in an allied field. For the manufacture of ammonia, hydrogen was required, and this was



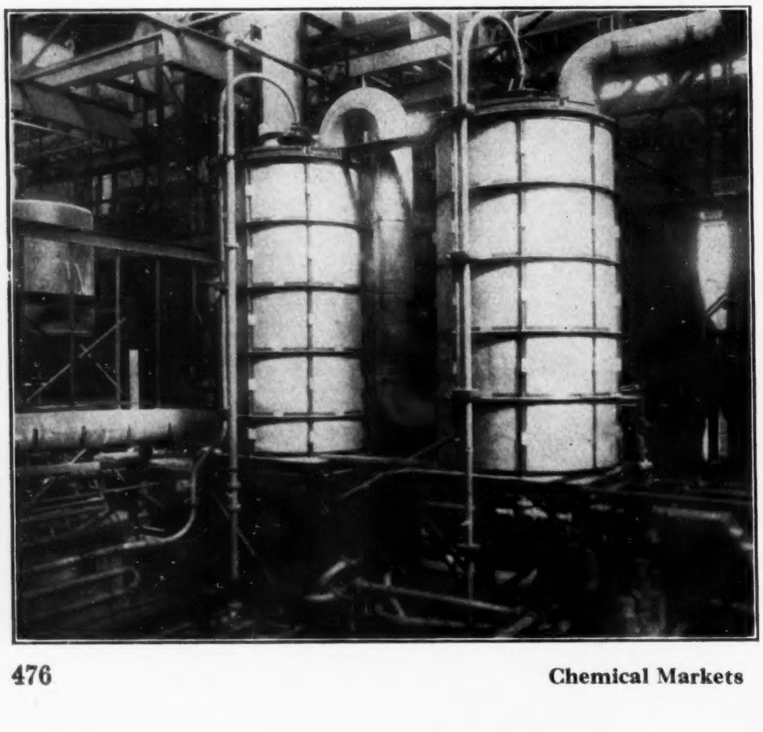
*View of nitre cake plant and sodium sulfate storage building at Copper Cliff, near Sudbury, Ontario, new works of Canadian Industries, Ltd.*

found as a by-product in the electrolytic decomposition of brine at the Salt Works in Sandwich, Ontario, but the Company's nitric acid plant, in which the ammonia is used, has been located at Beloeil, Quebec, where the manufacture of explosives, and the production of fertilizers and of ammonia chemicals are carried on.

Another avenue along which Canadian Industries has travelled is the manufacture of sodium acid sulfate at Copper Cliff where the great nickel copper smelting plants of the International Nickel Company of Canada are located. Until recently, it was difficult to secure a sale for nitre cake, and the nickel smelting plants in Canada were able to obtain large quantities at a low price, as it was a by-product, in the manufacture of nitric acid from sodium nitrate. Ammonia oxidation has changed this situation. Consequently, the new works of Canadian Industries Limited at Copper Cliff near Sudbury, Ontario, was erected to produce sodium acid sulfate as a direct product for use in nickel smelting.

From this brief sketch, it will be seen that the activities of Canadian Industries Limited extend in many directions but that their several plants producing varied lines are all allied to the original explosives business. In referring to the reorganization, the president of the Company said, "It will therefore be realized that the Company can no longer be regarded entirely as an explosives company but now serves a wide section of the Canadian public in a number of varied lines, the extension of its activities and prosperity largely resulting from its strong technical backing." It may be noted that Canadian Industries Limited is intimately associated in its commercial and technical affiliations with the DuPont interests in the United States and with Imperial Chemical Industries in Great Britain.

At Sandwich, Ontario, in the plant of the Canadian Salt Company, now owned by Canadian Industries Limited, caustic soda and chlorine are made by the electrolytic process during which hydrogen is evolved.



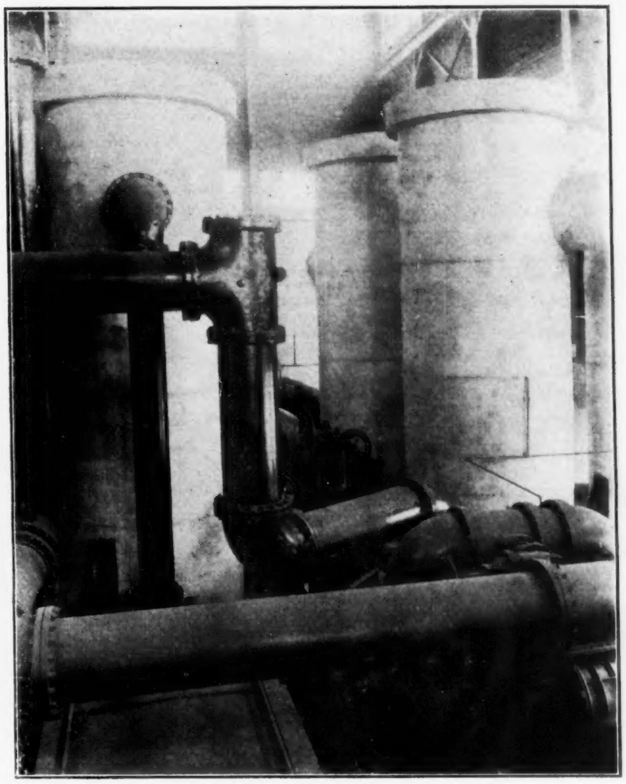
*View of acid scrubbers and general view of the complicated system of acid lines at Copper Cliff*

Formerly, this gas went to waste, now it is collected and pumped to the new ammonia department. The Casale process is used and the product, liquid anhydrous ammonia, is shipped chiefly to the Company's works at Beloeil, Quebec, where it is used to make synthetic nitric acid for use in the production of explosives.

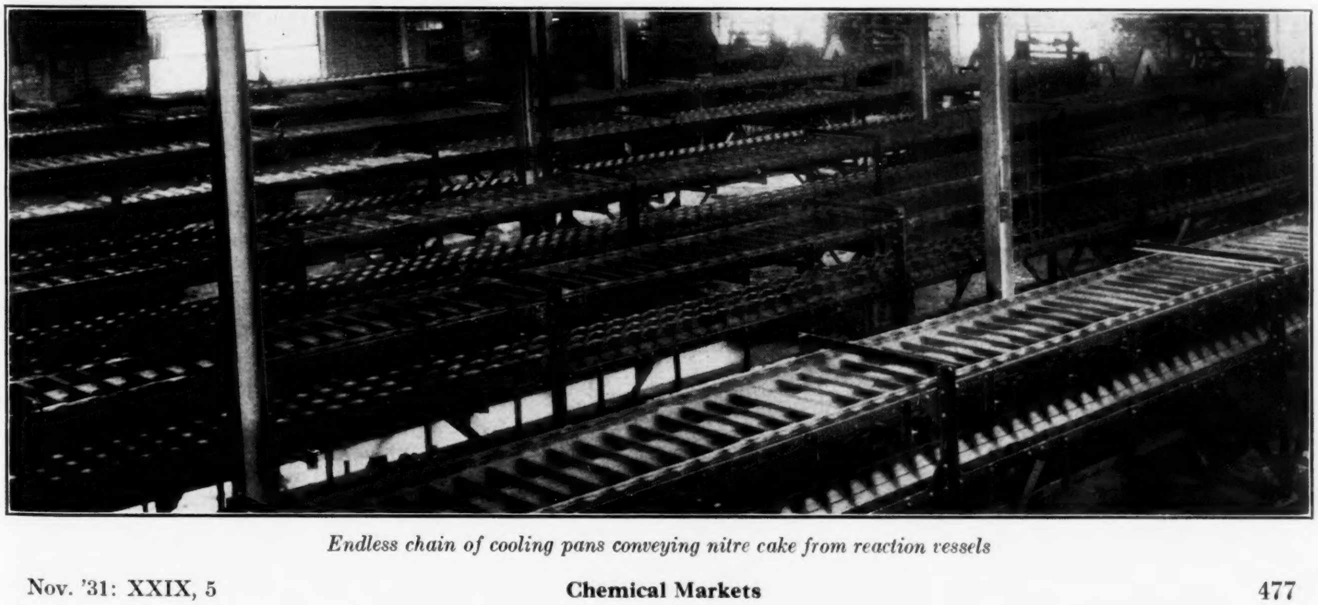
McMasterville is the town name of the plants situated some twenty-five miles from Montreal on the banks of that historic highway of discovery, the Richelieu River. Beloeil is the nearby village and railway station. In the heart of this old district new chemical enterprises are springing up. Those completed are the first ammonia oxidation unit in Canada and a superphosphate plant that is said to be so new in design and operation that it may be listed as the second works of its kind in North America. The raw material is synthetic ammonia, pure and anhydrous. The estimated possible plant capacity is twenty tons per twenty-four hours of 100 per cent nitric acid. The product is pure and suitable for nitrate manufacture, but requires concentration for glycerine nitration. There are no solid floors in this plant to obstruct daylight and the whole works is easily visible from most inside points. The plant is neither large nor expensive, its cost in round figures being $300,000, but it is important because it is the first Canadian synthetic nitric acid plant in operation. The works taken as a whole represent the accumulated experience of the best chemical engineers at the command of the largest chemical organizations in England, United States and Canada.

Mention has been made of the superphosphate plant at Beloeil. The same company has a similar fertilizer plant under construction at Hamilton, Ontario, strategically located to meet the needs of the great fruit-growing and garden district of the Niagara peninsula and western Ontario.

With the amalgamation of the International Nickel Company and the Mond Nickel Company, whose operations in the Sudbury area have made this section famous for many years as the world's chief source of nickel, a great impetus was given to the construction of subsidiary manufacturing plants to serve the mining enterprise. The Mond Company built in 1925 a sulfuric acid plant to utilize the sulfur-bearing gases from the Bessemer converters, and this plant was enlarged to more than double its previous capacity. Then, as noted in an earlier paragraph with the possibility of an insufficient supply of nitre cake, a new plant was constructed for the manufacture of sodium acid sulfate, an essential material in the refining of nickel by the Orford process. The elements of the operation are not complex. Sodium sulfate is recovered from natural lake deposits in Saskatchewan,



*Heat exchangers and large pipe-lines at Nos. 1 and 2 units*



*Endless chain of cooling pans conveying nitre cake from reaction vessels*

hauled to Sudbury by rail and treated with sulfuric acid. About one-half of the company's acid production is now used in the manufacture of nitre cake.

The sodium sulfate after screening is passed through a screw conveyer to a mixing chamber of the conveyer type where the sulfate and 93 per cent sulfuric acid are mixed to a thick paste continuously. From the mixing trough the acid and sulfate drop into an oil-fired retort where the nitre cake is formed. These retorts are similar to those used in nitric acid manufacture but have been redesigned for this purpose. The molten sodium acid sulfate overflows continuously through an opening in the side of the retort and is caught in a series of pans attached to a moving chain passing away from the retort at a rate of 120 feet per hour, so that the nitre cake has a chance to set and cool in the pans of the conveyer. The pans are sprayed with oil so that the cakes will drop out readily when cooled.

Another new development in Ontario is a plant in Toronto for the production of phenol, the cresols and cresylic acid. One of the principal outlets for the phenol will be in the manufacture of phenol-condensation products that have been made in Canada for some years from imported raw materials.

There has been a large output of chemicals from Quebec for many years. Shawinigan Falls was the centre of one of the largest wartime chemical developments. To produce an adequate supply of electric energy, the St. Maurice River, a turbulent stream with numerous small falls, was harnessed and by building suitable dams, a reserve of water supply created that insured a steady flow. One of the uses made of this electrical supply was to convert limestone into calcium carbide in electric furnaces and then, using calcium carbide as the starting material, the Shawinigan company built up a long series of synthetic chemicals of which the most important were acetic acid and acetone. Acetaldehyde, paraldehyde, crotonaldehyde, acetaldol and acetylene carbon black were added in due course, and more recently ethyl acetate, butyl acetate, butanol, ethyl lactate and pentasol acetate.

### Progress in Aluminum Making

Farther east in Quebec is the town of Arvida on the upper Saguenay near Lake St. John. Here, enormous hydro-electric plants have been constructed primarily to supply power for the manufacture of aluminium. At Isle Maligne the present installation develops 495,000 h. p. and the ultimate capacity is 540,000 h.p.; at Chute à Caron another plant supplies 260,000 h.p; and when the power from these two units is no longer sufficient to meet the needs of the industrial development that is proposed in this area, a new canal will be built to carry the water about two miles farther down the Saguenay to the mouth of the Shipshaw river where the remaining head will be utilized to develop another 800,000 h. p.

There are three units in the present electrometallurgical works at Arvida. The first is for the treatment of raw bauxite, which is put through an electric furnace process to remove impurities and furnish almost pure alumina for the production of aluminium. Bauxite is obtained from British Guinea and also from deposits in Arkansas and Missouri. The second plant produces carbon electrodes for use in the aluminium process, and the third and last is the one in which the aluminium is made and turned out in the form of pigs for shipment to markets all over the world. The aluminium plant is purely electrolytic; the alumina or aluminium oxide is dissolved in a bath of molten cryolite and then the metallic aluminium is plated out by the electric current, deposition taking place on the bottom of the furnace.

The industry at Arvida is a notable example of the utilization of Canada's plentiful supply of water power in the treatment of raw materials imported from other countries. It enjoys an excellent location not far from tidewater, twenty-two miles from the head of navigation on the Saguenay, and seventy-five miles from the St. Lawrence River.

### Government Aid to Industry

The application of scientific information to the control and improvement of industrial processes is promoted by an institution maintained by the Federal and Provincial Governments. At Ottawa, the Dominion Government is constructing a three-million-dollar building in which the National Research Laboratories will be housed. Already much work of great practical value has been done in the temporary laboratories established by the Council. Satisfactory methods for the utilization of Canadian magnesite and the development of a process for the production of alcohol from natural gas may be mentioned; investigations to determine the extent of the damage caused by the sulfur fumes from the Trail Smelter provided material for the amicable settlement of an international dispute; progress has been made in textile and laundry research; wool, leather, rubber, dehydration of fruits, maple syrup flavor, the constitution of alkaloids, honey spoilage, and work on emulsions are other subjects on which extensive research is now in progress.

In Ontario, a co-operative arrangement has been entered into whereby the Government and the industries have each subscribed to a fund, which now amounts to more than three million dollars, for the establishment of the Ontario Research Foundation. Laboratories have been constructed at Toronto and work undertaken in many fields. In western Canada, the Research Council of Alberta, closely allied to the provincial university, has done splendid work for several years on the study of problems relating to the development of the natural resources in that section.


# Service That Sells

***Recent Chemical Booklets That Win Favorable Attention As Well As Give Valuable Information***

IF YOU sent out a salesman to call on the trade and he went around dropping his calling cards on the desks of buyers, and then walking out again, how many contracts do you think he would secure!

You know that they would be mighty few and far between.

And yet, until quite recently, most chemical advertisements were simply announcements that the Jones Chemical Company was in business at such and such an address and sold such and such products, and the vast majority of chemical booklets were nothing more nor less than a rather unattractive looking price list.

The tremendous advances which have been made in the past five or six years in the printed publicity of the industry, is fairly obvious to all, both the form and substance are remarkable improved.

But there is another improvement to be noticed. Boasting about "service" has been replaced by rendering real services in the advertising. The old-fashioned, hard-shelled, chemical sales manager who criticised an advertisement detailing the manifold services of his company by saying—

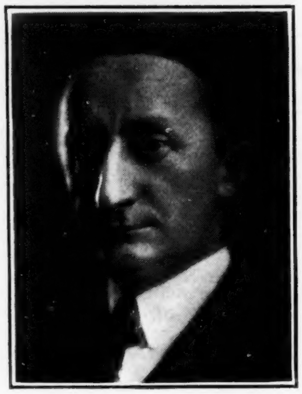
"Rot! delivering the goods we are paid for isn't service: it's only common honesty."

Has a good deal to be said in his defense. But when a chemical company sends out to users a booklet which is a virtual monograph on the chemical and physical properties and characteristics of one of its products, detailing its uses and setting forth its analysis, the containers in which it is shipped, and the points of shipment, it is placing a useful working tool into the hands of consumers.

"Handsome is, as handsome does." It is certainly no drawback to the effectiveness of these real service booklets when they are presented in a form as pleasing to the eye and as attractive to the attention as some of the recent publications.

The idea of attractiveness is carried in each booklet frcm cover to cover. By means of well-thought out subheadings, and in several cases, the generous use of photographs and charts, the reader is subconsciously urged to carefully read and digest the technical information contained. It is difficult to read fine print wedged into tight spaces, specially so when the text is of a technical nature. The furthering of technical knowledge is certainly not hindered, but rather distinctly furthered by bringing together the chemist and the advertising expert. The process equipment companies have appreciated and made excellent use of this fact for a number of years. It is a sign of progress to note the generous use of this splendid medium of publicity by so many of our leading chemical producing companies.

# What Is the Ideal Refrigerant?*



Eugene L. Ray

By Dr. Ward V. Evans†

GREAT strides have been made in the art of refrigeration in the past thirty years. Many of us remember when the milk can was hung in the well and the day's supply of drinking water was cooled by evaporation in an unglazed jug. The general principle of refrigeration, however, has not changed, only its mechanical application. The chief principle in refrigeration is the utilization of the latent heat of change of state for cooling purposes. Absorption is simply a modification of the same principle. Refrigeration is secured by allowing a substance to change its state and mechanically arranging the mechanism so that the latent heat is supplied by the substance we wish to have cooled. The substance changing its state is the refrigerant, and this change of state may be accomplished by motor driven machinery, thus necessitating moving parts, or as in absorption machines by the use of heat supplied usually by a gas flame.

Artificial refrigeration, in transportation, in storage and in the home, is an achievement deserving the highest commendation. The greatest advances in this art have occurred in the past ten years. It has been only recently that any substances other than carbon dioxide and ammonia were used as refrigerants. Recently however, with the advent of the household machine, a demand for other refrigerants that would have suitable characteristics to render them applicable to small machines, has arisen. The research sources of our industries have been taxed to find substances with suitable boiling points so that they could be liquified and evaporated without the use of great pressure or vacuum. Reviewing the history of refrigeration, we find that more than fifty different substances or mixtures have been at times used in compression and absorption machines. Table I gives a list of some of these substances, and other substances that might be used.

Most of the substances named in this table, however, are unsuitable for household refrigerants, chiefly because their physical constants are such that their latent heat cannot be rendered available without the use of special machinery.

### Table I

**Substances that May Be Used as Refrigerating Mediums**

| | |
|---|---|
| Glycerin | Dichlor methyl ether |
| Pentachlorbenzene | Heptane |
| Trichlorbenzene | Ethylene trichloride |
| Ethylene-glycol | Hydrogen sulfide |
| Methyl aniline | Trimethylene |
| Aniline | Methyl ether |
| Phenol | Methylamine |
| Dichlorbenzene | Trimethylamine |
| Decane | Dimethylamine |
| Chlorpydridine | Methyl ethyl ether |
| Chlortoluene | Ethyl ether |
| Pentachloretane | Dichormethane |
| Nonane | Carbon disulphide |
| Acetylene tetrachloride | Dethylamine – Di-ethylamine |
| Xylene | Acetone |
| Amyl alcohol | Methyl alcohol |
| Chlorobenzene | Hexane |
| Octane | Carbon tetrachloride |
| Tetrachlorethylene | Ethyl alcohol |
| Butyl alcohol | Benzene |
| Pyridine | Propyl alcohol |
| Toluene | Triethylamine |

Taylor, R. S.: Heat Operated Refrigerating Machines of the Absorption Type, Refrigerating Engineer 17:136 (May) 1929.

Table II includes a list of the present day refrigerants.

### Table II

| *Refrigerant* | *Symbol* |
|---|---|
| –Carbon Dioxide | $CO_2$ |
| Ethane | $C_2H_6$ |
| °Ammonia | $NH_3$ |
| °Propane | $C_3H_8$ |
| °Methyl Chloride | $CH_3Cl$ |
| °Sulfur Dioxide | $SO_2$ |
| °Isobutane | $C_4H_{10}$ |
| °Butane | $C_4H_{10}$ |
| °Ethyl Chloride | $C_2H_5Cl$ |
| –Dichloromethane | $CH_2Cl_2$ |
| –Dichloroethylene | $C_2H_2Cl_2$ |
| –Trichloroethylene | $C_2HCl_8$ |

This is the list of refrigerants mentioned in the Safety Code for Mechanical Refrigeration sponsored by the American Society of Refrigerating Engineers.

†Head, Chemistry Dept., Northwestern University
*Abstracts of address before National Safety Council

Those refrigerants marked with a circle are used chiefly in the small household units. The ones marked with a dash are high boiling refrigerants used for air conditioning. One other quite recent refrigerant may be added to this list. It is dichlorodifloromethane. Its boiling point lends it to use in the small machine.

Since the application of chemical refrigerants (that is refrigerants other than ice, water, and air) to all phases of our industrial and domestic life, the requirements for a refrigerant have vastly changed. All the refrigerants in common use are toxic substances so if we are to have them in our home we must know their properties. Their regulation becomes a health problem of first magnitude. Before the advent of the small machine the specifications for a refrigerant dealt only with its physical characteristics. Today the chemical and physiological properties are of at least as much importance. Also its cost of production must be considered.

Now what are the characteristics of the ideal refrigerant?

1. It must be non-corrosive.
2. The larger its latent heat the more possibility of its being efficient.
3. Its boiling point must be such that it can be liquified and vaporized without great pressure or excessive vacuum.
4. It should be non-toxic.
5. It should be non-flammable.
6. It should be non-explosive.
7. It should have a characteristic odor.
8. It should lend itself to detection of leaks.
9. It should be stable.
10. It should be incapable of forming toxic or obnoxious substances if exposed to flame.
11. It should have a low cost of production.

We have here a list of chemical, physical, and physiological characteristics for the ideal refrigerant to approach. It is a very large order, and we can safely say that the ideal refrigerant, like the ideal gas or ideal solution, is purely a figment of the imagination. If we attempt to rate the chemical substances that can be used as refrigerants we find that they all fail in at least one particular. They are all toxic and cause discomfort and even death if in sufficient concentration. Even carbon dioxide is harmful. Air and water are not possible because of improper boiling points and hence require excessive pressure on the one hand to cause liquifaction, and high vacuum on the other. We can construct a table of the substances whose boiling points and critical temperatures enable them to be used easily and economically as refrigerants in household units and state the qualifications we have outlined. We will have seven substances in our table if we include the latest discovered refrigerant dichlorodifloromethane.

We may arrange a table and rate our refrigerants from one to seven in regard to certain characteristics. One is the best rating owing to a specific property.

| | *Ammonia* | *Butane* | *Carbon Dioxide* | *Ethyl Chloride* | *Methyl Chloride* | *Sulphur Dioxide* | *Dichloro-difloro-menthane* |
|---|---|---|---|---|---|---|---|
| Immediate toxic effects | 6 | 1 | 2 | 3 | 5 | 7 | 1 |
| Delayed toxic effects | 1 | 1 | 1 | 1 | 7 | 1 | 1 |
| Flammability | 4 | 7 | 1 | 6 | 5 | 1 | 1 |
| Efficiency | 2 | 5 | 6 | 2 | 4 | 1 | 3 |
| Pressure developed | 6 | 2 | 7 | 1 | 4 | 3 | 5 |
| | 19 | 16 | 17 | 13 | 25 | 13 | 11 |

Journal of the American Medical Association, June 7, 1930. Vol. 94, pp. 1832-1838 and 1842 and 1843.

We see that none of these substances has a perfect rating.

# *Foreign News*

National politics and international finance overshadow several unusual events in English chemical industry in October. Premier MacDonald, "man without a party" finds it imperative to secure mandate for his National Government and general elections are held Tuesday, October 27.

Lord Melchett, co-sharing with Sir Harry McGowan the directorship of I. C. I. policies, assumes his late distinguished father's House of Lords seat to introduce a Bill, the avowed purpose of which is to declare a condition of economic stringency and to empower the Government to restrict imports so far as treaty obligations will permit and as may appear necessary to restore trade balance. While Lord Melchett's Bill is essentially an emergency measure, certain it is that England, staunch free-trade defender, will forsake in the very near future, her time honored policy for one of protection.

**Lord Melchett favors protection**

English scientists, chemists and thousands of the general public attend the Faraday celebration (rotogravure section). "Wizard of the benzene ring," is suitably honored as one of the really great founders of the modern sciences of physics and chemistry. Coinciding with this outstanding event is the centenary meeting of the British Association for the Advancement of Science.

England suffers an irretrievable loss in death of J. W. Hinchley, Professor of Chemical Engineering at the Imperial College of Science, more responsible in England for the organization of chemical engineering as a distinct profession than any other individual, he was personally known to hundreds of the chemical profession in this country and Canada.

### Chemical Prices Uncertain

English chemical prices are uncertain with the pound fluctuating widely but, generally speaking, they are higher. Producer are hesitating to contract ahead. One encouraging sign is the definite increase in demand from consuming centers and the rise in exports. Cosach announces prices similar to those for the United States, but exchange uncertainty makes it difficult to compare prices.

European Zinc Cartel decides upon additional 5% reduction in production, making total curtailment 50%.

# Synthetic Acetic Acid

## Recent Patents Point to the Possibility of Using Several Raw Materials Other Than Acetylene

By Dr. Charles E. Mullin*
and
Dr. Howard L. Hunter

IN THE following review of the patents covering the manufacture of synthetic acetic acid, from materials other than acetylene and carbide, the patents are arranged in approximately the same order in which they were discussed in the previous paper.

*Dr. Charles E. Mullin in his laboratory at Clemson College center of scientific investigation for southern textile industry*

### The Conversion of Ethyl Acetate

British Patent No. 274, 076, July 1, 1927; and French Patent No. 636,781, June 28, 1927, to the Holz-verkohlungs-Industrie A.-G., cover the production of concentrated acetic acid or a mixture of acetic acid and acetic anhydride from ethyl acetate. The ethyl acetate vapor is passed through a quartz tube heated to 600°C., containing a metallic phosphate other than iron phosphate, such as copper or silver phosphate. It is claimed that 98 per cent yields of 99 per cent acetic acid and some ethylene are obtained. It is specified that contact with iron compounds must be avoided.

### The Reaction of Formaldehyde With Carbon Monoxide

British Patent No. 334,207, May 27, 1929, to British Celanese, Ltd., S. J. Green, and R. Handley, covers the preparation of acetic acid by heating a mixture of carbon monoxide and formaldehyde vapor to 300 to 400° C at a pressure of 100 to 300 atmospheres. The presence of phosphoric acid, with or without the addition of copper compounds, is desirable. Aqueous formaldehyde may be used.

### The Isomerisation of Methyl Formate

British Patent No. 259, 641, June 13, 1925; and United States Patent No. 1,697,109, January 1, 1929, to H. Dreyfus, cover the conversion of methyl formate into acetic acid by bringing methyl formate vapor, under pressure and at a relatively high temperature, into contact with a catalyst at 250 to 400° C. The vapor is continuously isomerised to acetic acid, which distils off and is separated from the resulting vapor mixture by fractional condensation. The optimum conditions of temperature and pressure are 200 to 300° C. and 50 to 150 atmospheres, respectively. Catalysts such as the oxides of copper, tin, lead, or zinc, acetates of copper or zinc; methoxides of tin, zinc, aluminum, etc., or mixtures of these with potassium or sodium acetate, are specified as suitable for the reaction.

British Patent No. 319,030, March 16, 1928, to H. Dreyfus, covers the preparation of acetic acid or acetates from dimethyl ether and carbon monoxide. The reaction is brought about in the presence of sodium methylate or ethylate or alkali formates at 100 to 300 atmospheres and 300 to 400° C. The catalyst is preferably supported on coke or graphite. This process may be combined with the production of dimethyl ether. For this purpose, a mixture of methanol and sulfuric acid are heated together to produce dimethyl ether, and carbon monoxide passed through the hot reaction mixture. The presence of

*Dr. Mullin and Dr. Hunter conclude their review of synthetic acetic acid patents. Dr. Mullin is professor of chemistry, Clemson College, Dr. Hunter is assistant professor.

water is stated to favor the production of free acetic acid; the absence of water in the presence of an excess of dimethyl ether to favor the formation of methyl acetate. The methyl acetate formed may be saponified to give acetic acid and methanol or dimethyl ether.

British Patent No. 310,438, January 23, 1928, to J. Y. Johnson for the I. G. Farbenindustrie A.-G., covers the use of aluminum chloride at 30 to 60° C. or boron fluoride or chloride at 180° C., in the absence of air, as catalysts for the pressure reaction of methyl ether and carbon monoxide.

British Patent No. 226,248, June 22, 1923; and United States Patent No. 1,704,965, March 12, 1929, to H. Dreyfus, cover the preparation of acetic acid by the reaction of methane with either carbon monoxide or dioxide under 5 to 100 atmospheres or higher pressures. The temperature is kept below 500° C. and either hydrogenation catalysts, such as iron, nickel, cobalt, palladium, platinum, palladium black, platinum black, copper, etc., or metallic carbonates of the type of nickel carbonate, which dissociate with the liberation of carbon dioxide at temperatures between 100 and 500° C., may be used.

British Patent No. 262,832, June 13, 1925, to H. Dreyfus, covers the reaction of equimolar mixtures of hydrogen and carbon monoxide at temperatures of 350 to 450°, preferably 200 to 300° C. and at pressures up to 200 atmospheres, generally 50 to 150. The reaction is carried out in the presence of substances capable of forming acetates which decompose with the formation of acetic acid at the temperature employed. These substances are used alone when they are suitable, and in other cases they are used together with chemicals which assist reactions forming oxygenated organic compounds. Suitable catalysts are the oxides of tin, copper, etc., copper acetate, methoxides of aluminum, etc.

British Patent No. 317,808, May 18, 1928, to the I. G. Farbenindustrie A.-G., covers the reaction of gaseous mixtures containing the oxides of carbon and either hydrogen gas, or a gas containing a larger proportion of hydrogen than carbon monoxide. A pressure of 20 atmospheres is specified, and the catalyst is a mixture of an element from the first subgroup of the periodic table and a large quantity of an element of the eighth periodic group, preferably from the iron family. The further addition of less than 5 per cent of a metal forming a difficulty reducible oxide is advised.

French Patent No. 681,958, January 11, 1929, to the Societe Francaise De Catalyse Generalisee, covers the catalytic preparation of acetic acid from carbon monoxide and hydrogen. It states that nickel, chromium or cobalt, either alone or mixed, as metals, oxides or carbonates, or the preceding mixed with manganese carbonate, are suitable catalysts for this reaction. Where a mixture of metals is employed, they must be in the form of alloys.

German Patent No. 275,049, February 21, 1913, to J. Behrens, provides for the conversion of ethylenic compounds, isolated from distillation gases, into acetic acid by reaction with carbon dioxide. The gases are mixed and heated to about 400° C. The aldehyde produced is oxidized to acetic acid. It is claimed that about 75 per cent of the ethylene is converted into acetaldehyde by this process.

United States Patent No. 1,315,543, September 9, 1919, to G. O. Curme, assignor to the Union Carbide Company, covers the preparation of acetaldehyde by passing ethylene into a solution of a suitable mercury salt. This is subjected to anodic oxidation in aqueous solution. The acetaldehyde is removed by continuous distillation.

United States Patent No. 1,315,546, September 9, 1919, to the same Company and inventor as the preceding, covers the prolonged anodic oxidation of the aldehyde produced by the above reaction.

**The Synthesis of Acetic Acid from Methanol**

British Patent No. 264,558, June 13, 1925; and United States Patent No. 1,745,659, January 14, 1930, to H. Dreyfus, cover a process for the preparation of acetic acid by the reaction of methanol and carbon monoxide. Equimolar mixtures of the two compounds are heated to below 450° C., and preferably to 200 to 300° C., at pressures to above 200 atmospheres, generally 50 to 150. A catalyst is employed which is capable of forming acetates which decompose with the formation of acetic acid below 400 to 450° C., and preferably at 200 to 300° C. The oxides of copper, tin, lead, and zinc; copper or zinc acetate; zinc, aluminum, or tin methoxide, etc., either alone mixed, are specified as being suitable for the reaction. The operation is continuous and the catalyst is automatically regenerated.

British Patent No. 268,845, November 7, 1925, to H. Dreyfus, covers a process similar to the above, except that the reaction takes place at atmospheric pressure.

British Patent No. 283,989, July 20, 1926; and French Patents No. 637,763, July 16, 1927, and No. 669,370, February 8, 1929, to H. Dreyfus, cover the preparation of acetic acid or methyl acetate by heating methanol and carbon monoxide in the presence of an inorganic acid or an inorganic acid containing an organic group, such as sulfonic acid, or of a corresponding acid salt. The reaction takes place at 300 to 400° C. at atmospheric pressure, but pressures up to or above 300 atmospheres are preferred. Suitable catalysts are the various phosphoric acids, boric, arsenic and phosphomolybdic acids, and acid aluminum phosphate, either in the liquid or solid state, or distributed on a carrier, such as coke or graphite.

British Patent No. 317,867, February 22, 1928, to the British Celanese Company and H. F. Oxley, specifies that in the previously described patent, the activity of the catalyst may be increased by the addition of copper or a copper compound, such as cuprous phosphate. The reaction is effected in a vessel inert to phosphoric acid.

British Patent No. 320,457, August 16, 1928, to J. Y. Johnson for the I. G. Farbenindustrie A.-G., specifies that in the production of acids and esters from methanol and carbon monoxide, by the method described in British Patent No. 283,989, a catalyst should be used which does not sinter or melt under the conditions of the reaction, which contains a difficulty reducible metallic oxide, and less than two equivalents of an inorganic acid. Examples are given of chromium metaphosphate with 5 per cent of free acid, cerium metaphosphate with 8 to 10 per cent of free acid, or a 9 to 1 mixture of cerium and aluminum metaphosphates with 0.5 to 1 per cent of free acid.

British Patent No. 323,475, September 1, 1928, to J. Y. Johnson, of the I. G. Farbenindustrie A.-G., specifies that in the production of acetic acid by the method of British Patent No. 320,457, it is advantageous to increase the effective area of the catalyst by the removal of one or more constituents. An example is given of the removal of aluminum or antimony, as the chloride, by heating the catalyst in a stream of phosgene or chlorine. Water, ammonia, etc., may be driven off by heating in a vacuum in order to avoid fusion of the catalyst.

British Patent No. 323,512, of the same date and to the same patentee, covers the addition of activators, such as metallic halides to aid the reaction. The halides specified are sodium chloride, potassium fluoride or iodide.

British Patent No. 271,589, March 12, 1926; United States Patent No. 1,679,994, August 7, 1928; and Canadian Patent No. 273,715, September 6, 1927, to Synthetic Ammonia & Nitrates, Ltd., P. A. Smith, and H. G. Smith, cover the reaction of methanol vapor with sodium formate under hydrogen pressure at 200 to 300° C. Potassium formate or water is added to hold the formate in a molten condition. It is also stated that the gases tapped from a methanol synthesis plant, containing methanol vapor, hydrogen, and carbon monoxide, may be made to react under pressure with caustic alkali or an alkali carbonate at a temperature not exceeding 240° C. Some liquid phase must always be present.

German Patent No. 223,208, November 17, 1908, to E. A. and J. Behrens, covers the catalytic oxidation of ethyl alcohol to acetaldehyde by means of air in the presence of a contact substance, such as platinum or some platinized material. The aldehyde is separated by fractional distillation, aqueous sulfuric acid is added to increase its electrical conductivity, and the aldehyde oxidized electrolytically to acetic acid.

German Patent No. 229,854, June 15, 1909; and British Patent No. 28, 839, December 12, 1910, are additions to the previously described patent to the same inventors. They specify that in the manufacture of acetic acid from alcohol, a mixture of acetaldehyde and alcohol is obtained by the action of zinc oxide, or any other suitable metallic oxide, on ethyl alcohol. The aldehyde is isolated and oxidized by means of an equivalent amount of oxygen, introduced under pressure.

German Patent No. 287,360, June 19, 1913, to J. Behrens, states that the oxidation of acetaldehyde is accelerated by the addition of a small amount of water in the presence of catalyst, such as iron acetate. Ultra-violet light is also claimed to aid the reaction.

French Patent No. 383,595, January 12, 1907; and British Patent No. 726, January 11, 1908, to C. H. Jacob, cover the oxidation of alcohol by allowing it to fall slowly over diaphragms supporting a mass of porous lead, produced by the electrochemical action of aluminum on potassium plumbite. After oxidation to aldehyde by the lead, the liquid drops slowly into the positive compartment of an electrolytic cell where it is oxidized to acetic acid. The acetic acid then passes into the negative compartment containing sodium hydroxide, where it forms sodium acetate. The heavy solution of sodium acetate is drawn off at the bottom and recovered by crystallization.

An addition to the preceding patent, September 27, 1907, specifies that alcoholic liquors, produced by the saccharification and fermentation of starchy or other substances, may be electrochemically oxidized to acetic acid before distillation by the process described in the main patent. A catalytic agent and a temperature of 40° C. are suggested.

British Patent No. 238,033, June 4, 1924, to E. B. Maxted and B. E. Coke, covers the oxidation of alcohol to acetic acid by passing the alcohol vapor mixed with air or other oxygen—containing gas over various metallic vanadates, preferably tin, heated to about 300° C.

British Patent No. 290,523, November 30, 1927; and United States Patent No. 1,666,447, April 17, 1928, to S. Goldschmidt, cover the production of acetaldehyde and acetic acid by passing ethyl alcohol vapor mixed with air or oxygen over a silver catalyst, at a temperature of 380 to 440° C., preferably 400 to 420° C.

French Patent No. 650,771, March 12, 1928; and British Patent No. 287,064, March 12, 1928, to W. J. Hale and W. S. Haldeman, cover the conversion of primary aliphatic alcohols having boiling points below 350°C. into the corresponding acids. The vapor of the alcohol is brought into contact with a reduced metal, such as copper, which removes hydrogen and converts the alcohol into the aldehyde. This is then exposed to a metallic oxide, such as copper oxide, from which it takes oxygen to form the acid.

*Crude Argols, the basis for Tartaric Acid*

# How Prohibition and a Cartel Affect Our Tartaric Acid Industry

Tartaric acid prices in 1931 have held better than prices for citric acid. In the past nine months, citric acid declined nearly twenty-four per cent and tartaric about seventeen per cent. From many angles a close analogy exists when conditions in both markets are compared. In several ways striking differences are apparent immediately.

Reference to a price-trend chart appearing in the August issue of Chemical Markets (page 158) shows that with the turn of the current year citric acid prices started a very noticeable decline with appreciable losses in February, April and August. A glance at the accompanying tartaric acid chart shows that up to August the price structure remained fairly stationary considering present business conditions and the stress of severe competition existing between domestic and imported material. Tartaric acid at the moment is three and one half cents lower than the price prevailing in 1913 and in the major portion of 1914.

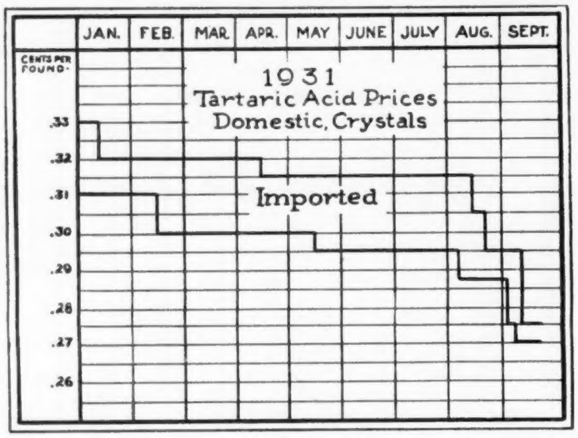
The situation surrounding tartaric acid manufacture and marketing has been highly controversal for several years. In this it is similar to the status of citric previous to 1929. Unlike citric, no new, outstanding development in manufacture, revolutionary in character, has been perfected in this country. Consequently, imported tartaric still supplies a portion of present need and it seems quite likely it will continue to do so for some time to come. Domestic producers of both of these important organic chemicals have faced the resources of foreign manufacturers combined in a strong cartel. A splendid piece of original research resulting in the present fermentation process of manufacturing citric acid has liberated us in one instance, but as yet we are somewhat dependent upon foreign markets for tartaric acid, and almost entirely for the raw materials from which the acid is produced.

Little change has been made in the original method of producing tartaric acid. The name tartaric is derived from the Arabic "tartir"—a deposit. In the manufacture, or more correctly, in the ageing of wine a deposit called "argols" is gradually built up on the sides of the huge casks. At intervals this is removed and sold as raw material for the manufacture of tartaric acid and cream of tartar. The sludge forming at the bottom is also a source and is generally known as "lees." Chemically both argols and lees consist principally of crude acid potassium tartrate (60-85%). The lees or argols is dried at 110°C., usually in a rotary kiln drier, to stop bacterial decomposition. The dried material is then passed through a steam-heated ball mill. The resulting product is a fine dry powder. Water is then added to form a paste and the mass is pumped into tanks where it is treated with calcium carbonate (chalk) and calcium sulfate, converting the tartrate into calcium tartrate. The latter is then washed with water and treated with sulfuric acid to convert the calcium tartrate to tartaric acid. The solution is filtered to remove the residue. The filtered solution is then concentrated by evaporation in vacuum pans. The sludge is passed into granulators where the tartaric acid crystalizes and is removed by centrifuges. The crystals are redissolved in water and treated with keiselguhr and decolorizing carbon. Also very small quantities of calcium ferrocyanide and barium sulfide are added to remove traces of iron, copper and lead which accumulate in the crude acid during the process. The most delicate part of the entire manufacturing operation is that of the first treatment of the argol with lime and calcium sulfate. A very close check must be maintained on the acid content of the raw material. The two reactions which take place in this first manufacturing stage are as follows:

(1) $2KHC_4H_4O_6 + Ca(OH)_2 = K_2C_4H_4O_6 + CaC_4H_4O_6 + 2H_2O$
(2) $K_2C_4H_4O_6 + CaSO_4 = CaC_4H_4O_6 + K_2SO_4$

Calcium chloride may be used instead of calcium sulfate with the same results. A second comparatively difficult step is the treatment of calcium tartrate with

sulfuric acid to form tartaric acid. Usually 60 per cent acid is employed and samples are withdrawn from time to time, 5 c.c. being added to 50 c.c. of calcium chloride solution and heated on a water bath. When a faint white precipitate is formed after ten minutes it is taken as an indication of the presence of




*On Sept. 26 domestic producers reduced the price to 26½c and on Oct. 15, importers lowered the price to 26c*

a trace (0.2 per cent) free sulfuric acid and a sufficient quantity of calcium tartrate is added to completely neutralize this slight excess. In the stage where the concentrated solution of tartaric acid is passed into the evaporators (usually multiple effect evaporators) three distinct crops of crystals are obtained at 30°, 43° and 54° Bé.

The pathway of domestic producers of tartaric acid has not been strewn with roses. Having little or no control over raw materials they had been handicapped at the very beginning, being forced in many instances to buy raw material from the same countries and often from the same individuals who were making desperate efforts to supply this market with the finished product.

Previous to Prohibition this country did possess a small wine producing industry, situated mainly in California. With the advent of the dry law manufacturers were forced to bring in additional crude argols and lees from abroad from the wine producing countries such as Italy, France, Northern Africa and to a lesser degree from Argentina. By a curious twist in the framing of our tariff laws manufacturers of tartaric acid were forced to pay a five cent tax on crude material to add to their manufacturing costs despite the fact that no domestic wine industry existed.

The normal domestic consumption of acid in this country is estimated at six to eight million pounds. A moment's consideration of the comparison of 1929 and 1930 import figures show clearly how competitive the domestic and imported materials are. Imports in 1930 amounted to 2,912,000 pounds valued at $799,000 against 2,220,000 pounds in 1929 valued at $689,000. Comparative figures for the shipments into the United States from the two countries that are practically the sole source of importations are: Germany, 2,229,000 pounds in 1930, and 1,540,000 pounds in 1929; Italy, 659,000 pounds in 1930, and 553,000 pounds in 1929. The much greater importance of Germany over Italy in the matter of imports into this country is explained by factors in this country as being merely a subterfuge of the tartaric acid cartel to confuse the tariff question in this country at the time of the hearings which lead up to the adoption of the Hawley-Smoot Tariff. Foreign producers were given ample warning of impending tariff changes. In 1928 at the insistence of acid and cream of tartar manufacturers the Tariff Commission undertook a survey of foreign and domestic costs looking to a change in the six cent rate by means of presidental proclamation. There is little question but what Italy is the low cost producer.

The ebb and flow in the volume of crude potassium bitartrate imported since 1914 is given below:

**Argols, Crude Tartar, Wine Lees or Partly Refined Bitartrate**

| | *Pounds* | *Dollars* |
|---|---|---|
| 1914 | 23,810,048 | $2,654,618 |
| 1915 | 28,814,957 | 3,122,326 |
| 1916 | 34,602,184 | 5,233,516 |
| 1917 | 24,142,073 | 3,886,854 |
| 1918 | 30,364,538 | 5,312,836 |
| 1919 | 32,399,932 | 5,336,939 |
| 1920 | 23,578,221 | 3,282,315 |
| 1921 | 26,569,756 | 3,042,334 |
| 1922 | 18,744,192 | 1,216,700 |
| 1923 | 21,949,727 | 1,738,874 |
| 1924 | 17,573,935 | 1,237,653 |
| 1925 | 20,646,972 | 1,387,637 |
| 1926 | 26,260,293 | 1,789,044 |
| 1927 | 22,411,194 | 1,749,692 |
| 1928 | 20,959,643 | 1,969,784 |
| 1929 | 14,151,580 | 1,550,633 |
| 1930 | 16,346,824 | 1,925,012 |

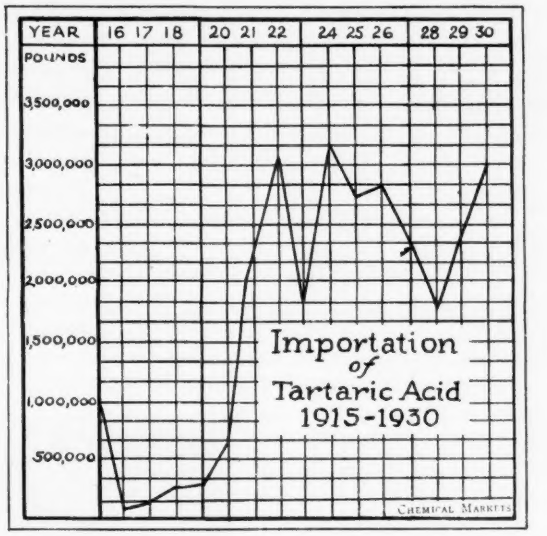
The importation of finished tartaric acid is shown by pounds and value and also graphically:

| | *Pounds* | *Dollars* |
|---|---|---|
| 1915 | 820,105 | $273,880 |
| 1916 | 198,873 | 84,373 |
| 1917 | 268,180 | 162,478 |
| 1918 | 384,262 | 231,099 |
| 1919 | 654,736 | 447,571 |
| 1920 | 1,367,103 | 850,369 |
| 1921 | 2,317,944 | 706,733 |
| 1922 | 2,792,163 | 648,459 |
| 1923 | 2,438,129 | 594,201 |
| 1924 | 2,997,233 | 626,266 |
| 1925 | 3,472,252 | 690,979 |
| 1926 | 2,847,958 | 578,880 |
| 1927 | 2,250,908 | 457,727 |
| 1928 | 1,889,277 | 514,780 |
| 1929 | 2,220,000 | 689,000 |
| 1930 | 2,912,000 | 779,000 |

It is readily apparent from the above figures that the tendency in 1929 and 1930 in the total amount of imports of finished acid was decidedly upward. Figures for 1931 are apt to be confusing because of depressed business conditions and it is hardly to be expected that the changes in the tariff structure made

in the middle of 1930 will be shown in their true perspective until such time as conditions again approach a normal demand.

The tariff history of crude potassium bitartrate and tartaric acid is interesting and instructive. In the Tariff Act of 1909 both tartaric acid and cream of tartar were dutiable at five cents per pound, but this rate was reduced to three and a half cents in 1913 for the acid and two and a half cents for the salt. The Tariff Act of 1922 again increased the duty on the acid to six cents and the salt five cents. Efforts were made in 1926 and again in 1928 by domestic producers looking to have the six cent rate raised to nine cents, the maximum of 50 per cent allowable under the flexible provisions of the Tariff Law. While the Tariff Commission was still studying the problem in accordance with the request made in 1928 the hearings were started by the Ways and Means Committee. The four domestic producers were represented at all of the hearings and considerable opposition developed from large consumers. Finally in the adopted schedules tartaric acid duty was raised from six to eight cents while the rate on argols, tartar and wine lees containing less than 90 per cent and crude calcium tartrate was reduced from five per cent to the free list.




*Importations have varied considerably from year to year whereas domestic production has maintained a steady pace*

Despite the wide fluctuation in the yearly import figures domestic manufacture has shown but very little variation. The following figures are taken from the Census of Manufactures and represents the total production of the four domestic producers.

| *Year* | *Tonnage* | *Value* |
|---|---|---|
| 1919 | 5,312,965 | $4,262,376 |
| 1923 | 5,868,000 | 1,544,431 |
| 1925 | 5,498,920 | 1,541,955 |
| 1927 | 5,781,166 | 1,810,910 |
| 1929 | 5,906,479 | 2,059,680 |

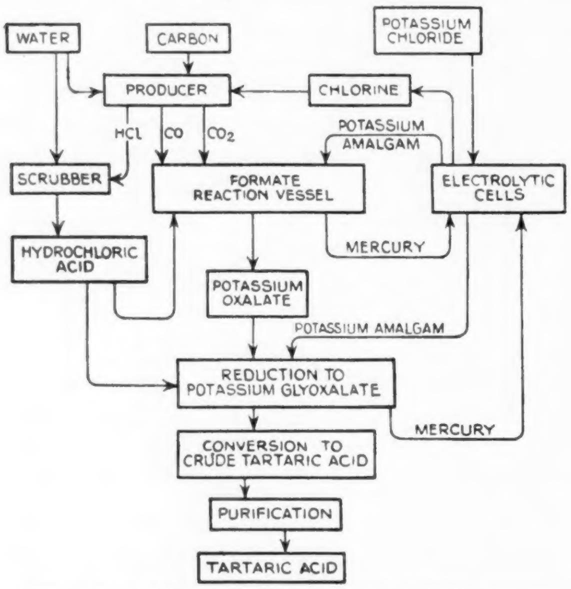
Like so many other chemicals whose rates were considerably altered by the tariff change in 1930 it is next to impossible to arrive at any definite conclusions as to the ultimate results such change has had in the case of tartaric acid. Normal consumption is undoubtedly higher than sales at the moment. Business depression being international in scope foreign producers must be looking at the American market with more than usual keen desire of attainment to offset the very noticeable losses in other fields. The arrangement between the German and Italian producers seemingly is working out very effectively. From the following figures giving the complete details of Italy's exports for the past three full years it is seen that Italy is refraining from shipping into Germany. Also it is reported on reliable authority that the major part of the exports to the United States have been placed in German producers hands.

| | *1930 Metric Tons* | *1929 Metric Tons* | *1928 Metric Tons* |
|---|---|---|---|
| Belgium | 73 | 64 | 72 |
| Bulgaria | 4 | 30 | 39 |
| Czechoslovakia | 139 | 116 | 69 |
| Denmark | 12 | 5 | 8 |
| France | 523 | 517 | 328 |
| Germany | 7 | 49 | 66 |
| United Kingdom | 673 | 621 | 477 |
| Greece | 50 | 96 | 99 |
| Norway | 8 | 8 | 6 |
| Holland | 32 | 17 | 22 |
| Roumania | 118 | 172 | 136 |
| Spain | 25 | 87 | 159 |
| Sweden | 5 | 5 | 13 |
| Switzerland | 74 | 82 | 35 |
| Turkey | 20 | 24 | 34 |
| Japan | 106 | 75 | 50 |
| British India | 111 | 111 | 130 |
| Dutch East Indies | 13 | 5 | 13 |
| Palestine | 14 | 11 | 43 |
| Algeria | 83 | 187 | 29 |
| Egypt | 5 | 6 | 45 |
| Argentina | 854 | 1,141 | 1,036 |
| Brazil | 28 | 39 | 42 |
| Canada | 5 | 10 | 24 |
| Chile | 7 | 6 | 1 |
| Cuba | 6 | 28 | 25 |
| U. S. A. | 310 | 284 | 214 |
| Uruguay | 42 | 36 | 26 |
| Other Countries | 267 | 275 | 221 |
| Total | 3,612 | 4,110 | 3,463 |

One significant result of the present competitive position is an appreciable lessening in the difference between domestic and imported prices. At the beginning of the current year domestic crystals were selling at 33 cents against 31 cents for imported. This differential was maintained in the face of two reductions in prices for both up to the middle of August when the gap was narrowed to one cent and in the present month (September) it was further reduced to a half cent.

Few changes of any great importance have been noted in the past few years. The largest single use of course continues to be in the manufacture of baking soda compounds and two of the four domestic producers of tartaric acid manufacture primarily for their own consumption marketing only what surplus they

have. It is said that only a small proportion of tartaric acid is used as such (about eight per cent) and that the bulk of tartaric acid finds its way into commerce as cream of tartar and Rochelle Salt. Although cream of tartar (acid potassium tartrate) is a salt of the acid it is made directly without going through the intermediate acid step.




*Flow sheet of the Baekeland and Peter synthetic process*

A solution of argol is made and when boiling it is treated with milk of lime until slightly alkaline. Sodium carbonate is then added and the tartaric acid is then all in the form of Rochelle Salt. After being purified in about the same way as for the acid the clear solution may be concentrated if Rochelle Salt is desired or it may be treated with sulfur dioxide and reaction three takes place. The precipitated crystals are filtered and washed. The reactions taking place are as follows:

(1) $2KHC_4H_4O_6+Ca(OH)_2 = K_2C_4H_4O_6+CaC_4H_4O_6+2H_2O$

(2) $K_2C_4H_4O_6+CaC_4H_4O_6+Na_2CO_3 = CaCO_3+2KNaC_4H_4O_6$

(3) $2KNaC_4H_4O_6+2SO_2+2H_2O = 2KHC_4H_4O_6+2NaHSO_4$

Other uses are in the preparation of effervescent medicinal preparations. It is also used in soft drinks and confections and in some instances has replaced the more expensive citric acid although it is not true that these two organic acids are really competitive. Some tonnage is consumed by the dyestuffs industry, in photographic printing and developing and in the dyeing and printing of textiles. The principal salts are of course the cream of tartar; (potassium acid tartrate) Rochelle Salts, (sodium potassium tartrate) and tartar emetic potassium antimony tartrate.

A great deal of research work has been carried on abroad and here looking for a synthetic or fermentation process. A number of patents have been granted, but as yet none have appeared to be practical from a commercial viewpoint. The splendid work done on the fermentation process for the manufacture of citric will undoubtedly spur research workers on to renewed efforts.

Perhaps the most feasible process is that known as the Baekeland and Peter and described in detail in "The Production and Uses of Tartaric Acid" by G. Malcom Dyson, Phd.,A.I.C., appearing in the Chemical Age (London) April 6, 1929. The flow sheet of the process is shown above. The process is rather complicated. It is based on rather involved electrolytic operations and also high pressures.

## *Association News*

Third International Bituminous Coal Conference to be held at Carnegie Institute, Pittsburgh, Nov. 16 to the 21st, will be featured by a number of valuable papers of a chemical nature. Rapidly the belief is gaining ground that the only solution for the soft coal industry lies in widening the scope of industrial application of chemical knowledge. So diverse are the troubles that beset the industry that it has utterly failed to share in the last three eras of national prosperity. Such a chemical program is then an admirable one under the circumstances. Among the chemical papers to be presented are: Dr. Friedrich Bergius Germany, "Early History of Hydrogenation", Charles J. Brand, "The Fertilizer Industry as an Outlet for Coal and Its Derivatives", A. C. Fieldner and J. D. Davis, "The Relation of Chemical and Physical Tests of Coal to Coking Properties and By-Product Yields." Dr. L. V. Redman, A. C. S. president-elect and 1931 Grasselli medalist will also speak on a subject to be announced at the meeting.

**Charles J. Brand talks to coal producers**

Eagle-Picher Lead Co., president, W. E. Maston is elected president National Paint, Oil and Varnish Association at Atlantic City convention Oct. 8, by 500 of the Association membership.

The most comprehensive discussion ever given of methods for testing oxy-acetylene welded joints will be one feature of the thirty-second annual convention International Acetylene Association at the Congress Hotel, Chicago, Nov. 11, 12, and 13.

At the weld-test session, Nov. 11 at 8.15 P. M., Prof. H. L. Whittemore, U. S. Bureau of Standards will speak on importance of tests to welders and to users and makers of welded products. There will be a dramatized demonstration of visual and stethoscopic tests; hammer, bending, tension and hardness tests; invisible-ray tests; specific gravity, compression, and internal pressure tests.

Chemical Industry Session, Nov. 13, at 10.00 A. M., will deal with high-pressure, high-temperature chemical piping; methods of welding the new corrosion-resisting alloys; and welded power piping. Charles Gorton, chairman, Uniform Boiler Law Society, will explain the use of gas welding under revised A. S. M. E. Boiler Code.

A. C. S. President, Prof. Moses Gomberg, finishes extended lecture tour at Indianapolis, Nov. 10, visiting local sections as far west as California. Dr. L. V. Redman, Bakelite vice-president, is the Grasselli Medal recipient, Nov. 5, from the hands of Dr. D. D. Jackson, Columbia University, professor and authority on municipal water supply, for his famous paper "Research as a Fixed Charge."

# Plant Management

*A Department*
*Devoted to the Business Problems of Chemical-Process Production*

## Technological Unemployment

THE Chemical Engineers have a timely and important task in their study of technological unemployment; a subject which at the moment will enlist lively interest and call for active co-operation. Their task of collecting data is thus immeasurably lightened.

ON THE other hand, their interpretation of the data must guard against the abnormal influences upon employment which have been exerting so heavy an influence during the past couple of years. This will be a very delicate piece of analysis in which errors might very seriously effect the conclusions.

THE chemical industries bear a bad name as prime instigators of technological unemployment, and it is to be hoped that this report will make a thorough and very serious effort to strike a fair balance. Ever since the beginning of the Machine Age, chemicals in industry have been employed to save time and labor. From Javalle water for bleaching to quick drying lacquers to replace varnish, this has possibly been the major economic service performed by chemicals. Of late years, chemicals have a new function, that of replacing natural materials with those of chemical origin. In both of these respects chemicals have doubtless caused unemployment, but there is on the other side of the ledger much to be credited in the creation of new industries resulting from chemical discoveries. A painstaking effort to appraise these chemical contributions to this modern problem would be very much worthwhile. Results so definite as to be beyond cavil could hardly be hoped for, but appraisals by the very distinguished Committee who has this work in hand, would be most highly interesting.

THE study of this Committee is going to have much more than a timely interest. The next industrial era is bound to see a tremendous extension of chemical processes in all sorts of fabricating fields and a very great expansion in the use of chemically manufactured raw materials. It would be more than useful in charting the course of American industry to know as definitely as we are able what effect this further chemicalization of manufacturing process is going to have upon employment, for the problem which is attached is a practical one of far reaching effects. Having replied to the questionnaire of the Secretary of Labor, this Committee should continue its studies.

# Specifications for Safety

by Stewart J. Owen, Jr.

Safety Engineer, National Safety Council

**The National Safety Council's Annual Meeting held in Chicago, October thirteenth to sixteenth, was given splendid support by the chemical industry. More and more safety is being recognized as a major problem of chemical plant management. In this issue appears the last of four special articles written exclusively for Chemical Markets by engineers of the National Safety Council on various phases of the subject of safety together with abstracts of two highly valuable papers presented at the Meeting.**

PROGRESSIVE plant managers are putting more and more basic engineering into their programs to reduce the numbers and the costs of industrial accidents. This does not mean that the human factors that cause many accidents—such as carelessness, ignorance, lack of proper training or placement, fatigue and illness—are being neglected. Rather, it is being recognized more and more that the very best approach toward the control of the human causes of accidents is the removal of as many as possible of the mechanical causes of accidents.

Good arguments to support this new engineering view of accident control are at hand. First, the very best way for the manager of a chemical plant to prove to his workers that he sincerely wishes to do all that he reasonably can do to make his plant more safe, is to start a thorough program to remove the plant mechanical hazards that his workers usually already know about. Second, such a program to remove mechanical hazards—even though it may be quite costly, as it often is—usually turns out to be a good long-time investment for the reduction of direct and indirect accident costs. Third, such a mechanical safety program always is an efficiency program also, since every accident to materials or workers represent an efficiency program also, since every accident to materials or workers represent an efficiency failure which ought to be brought under control and which usually can be.

### A New Type of Safety Engineer

This new viewpoint of the more complete engineering control of accidents is bringing to the front a new type of safety engineer. Many of the old-time safety engineers gives relatively too much attention to mere safety education and the addition of temporary safeguards, and too little attention to a program toward a basic removal of hazards. From this viewpoint some persons have been so unkind as to charge that engineers as a group, including a certain percentage of safety engineers, with partial responsibility for thousands of accidental deaths that might have been prevented through the type of control which has been called "engineering revision."

This new term "engineering revision" was first used by Lucian W. Cheney one of the pioneers in the industrial safety movement in the United States.

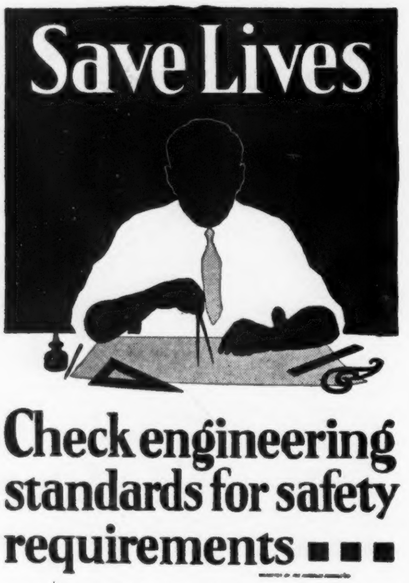
### Many Factors Enter Into Safety

"Engineering revision," says Dr. Cheney, "was devised to include the widest possible application of engineering skill to the safety of industrial plants. It includes the design and location of the buildings with special reference to the necessary connection with transportation facilities, ready and safe access to every point where workers must go, the provision of adequate and properly arranged lighting, the provision of machines designed from the safety standpoint, the guarding of such machines of faulty design as the plant is unfortunate enough to have, the proper attention to all dangerous conditions."

Under this new kind of safety program the modern safety engineer is becoming, in literal fact, an efficiency engineer. He takes the view that practically all industrial accidents can be explained in the terms of human or mechanical failure, through causes which are largely controllable.

This new type of safety engineer necessarily must be very familiar with all plant operations, since there

are no set rules to be followed in a plant engineering revision program. The safety engineer must be able to recognize and to analyze the hazards of every plant department. He must make a careful and complete study of all plant operations and of the entire plant




*Poster prepared by the National Safety Council to stress the importance of engineering in the progress towards reducing accidents to a minimum*

processes. He must become so familiar with the reasons why these hazards exist and how they might be controlled that he can talk intelligently about these facts with all executives who have power to aid him in making the changes that he desires. He should become so familiar with all of the chief plant operations that he could efficiently take the place of many of the operating supervisors and foremen if he suddenly should be invited or if an emergency occurred.

This new viewpoint of plant accident control demands a long time safety program. It demands the recognition by the plant manager that accident control represents one of the most important features of efficient plant management, since accidents usually do represent a considerable part of operating expense and since a large part of this expense usually can be eliminated, as proved by the experience of many thousands of plant managers in a wide variety of industrial operations.

This new engineering view of plant safety goes back wherever possible to original plant construction plans. Where this safety inspection of original plants is not possible, the engineering revision program most certainly should be followed as regards the safety revision of all new plant additions and reconstructions, and the safety checking of all new plant equipment before it is ordered and again before it is released for plant operation.

The plant manager who develops such an engineering revision program should expect the following advantageous results:

1. Maximum plant safety at a minimum cost.
2. Certain accident prevention results not obtainable later at any cost.
3. The easiest method and lowest cost of complying with city and state safety requirements.
4. The easiest compliance with insurance requirements, resulting in premium reduction.

The safety director who is responsible for such a plant program should work out in detail a plan to follow. Here are some practical suggestions:

1. Have a general conference with the management, to discuss the importance of the subject and to map out a course to be followed.
2. Discuss the program in detail with the engineers, or the architects at work on any planned construction improvement.
3. Review with them the present working specifications.
4. Get the privilege of advance checking of all purchasing orders.
5. Perhaps visit the plants where the equipment which will be used is being manufactured.
6. Keep in close touch with all construction operations.
7. Arrange to make safety inspections of all new plant improvements, and new or repaired equipment before it is released for use.

The safety director, as referred to above, may be an executive or a designing engineer on the company staff who has been made responsible for this particular engineering program. He may be the regular company safety engineer or safety director. He may be "an outside" consulting engineer; or he may be an engineer associated with an insurance company or a state department of labor.

It is very important for the official in charge of the safety engineering program to get exactly the right kind of start so that he may work in complete harmony with the designing and drafting staff. It always is good policy to go first to the head of the engineering department, rather than to the draftsmen who are preparing the drawings or to the specification writers. Otherwise it may happen that the safety engineer will find that he is "in wrong."

### Contact With Purchasing Department

When such a program is under way the safety engineer should keep closely in touch with the purchasing department. He should be called into conference when this department is planning any kind of new construction or alterations which will result in the purchase and installation of new equipment. Under this plan the experience of the safety man may be utilized through the proper selection of materials and equipment in such a way as possibly to save his company many hundreds and possibly many thousands of dollars which otherwise might be lost in making changes or in adding safeguards at a later date, or through permitting the continued use of equipment which is hazardous and which must be

protected at considerable cost in labor and efficiency.

The plant or department engineer in charge of such improvements may be well acquainted with the efficiency values of the new construction or equipment. But he may not be familiar with the possible accident hazards and he may overlook the safety requirements of the state and insurance companies. For this reason many companies provide that the plant safety engineer must approve all blue prints of new construction and the specifications for all plant improvements.

### Checking New Machinery

The safety engineer also should be consulted by the purchasing department as to the planning of proper safeguards for new machinery which is ordered. Manufacturers who have sales outlets in many different states are required to meet such a variety of state safety regulations that their standard machine safeguards may not meet the full requirements of a particular state or city, or the plant safety standards. Also, it sometimes happens that where there is sharp competition in the sale of new machinery the quoted price may not include all necessary safeguards unless such safeguards are specifically listed. Most manufacturers in these days desire to incorporate as many safeguards as possible into the original design, since such improvements also usually have an efficiency quality which adds value to the machine.

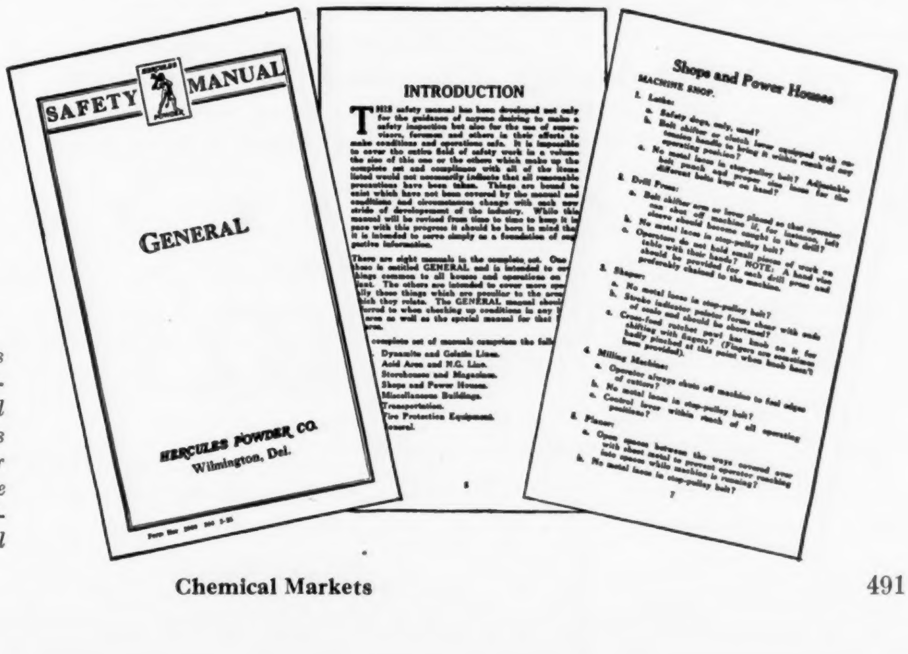
In order to be certain that all state and all insurance requirements are met for the safeguarding of new machines, the safety engineer must be familiar with the standard safety regulations of these agencies. For this reason there is a growing tendency among modern plants to adopt their own carefully worked out plant safety codes, based on state and insurance company requirements. As a step toward national standardization of all safety regulations, the American Standards Association has prepared a considerable number of codes which usually are accepted as authoritative by states and by insurance companies.

The safety engineer should be familiar with all of these codes which relate especially to the hazards of his plant. These codes also are supplemented by more than 100 Safe Practices Pamphlets which have been developed through a period of about 15 years under the auspices of the National Safety Council and through co-operation with a Conference Committee of the leading safety Engineers of the United States and in cooperation with trade organizations and individual-authorities in the specific field of the investigation. In many instances these Safe Practices Pamphlets have represented the first general and systematic effort to assemble the best practical safe practices relating to a specific hazard or a specific industry and are the best collection of information now available. In many cases these pamphlets have helped to stimulate the compilation of national safety codes now accepted as official by many states and by governmental departments.

To assist plant safety directors who have the engineering viewpoint, the National Safety Council in co-operation with special authorities and the Conference Committee of about 75 leading safety engineers of the country has prepared a special safe practices pamphlet on "Checking Plans and Specifications for Safety." This pamphlet has assembled a classified check list of possibly a thousand suggestive items to aid the safety engineer in planning various kinds of plant construction or improvement.

In new construction the safety engineer first should give attention to possible hazards incident to general plant layout. He should plan to make the best use of natural topography to eliminate hazards from grade crossings and elevating of materials. Also, attention to natural and artificial drainage for avoidance of hazards from muddy roadways and walkways, icy roadways and walkways, the flow of hazardous liquids, and the proper disposal of industrial waste. He should give attention to proper location of drinking water wells (if any), and the location and protection of buildings with serious fire or explosion hazards.

Most accident hazards relating to new construction also relate to future extensions. Among these are




*A number of large chemical companies find it desirous to supplement the literature of the National Safety Council with specially prepared booklets dealing with specific problems. For the smaller manufacturer the Safe Practice Booklets are the most authoritative guides and are available to all*

many possible hazards relating to railroads, roadways, footways, fences. There are many possible hazards relating to pipe lines for the conveying of water, steam, oil, fuel, gas, chemicals, ammonia, etc. These hazards may come from frost; by mechanical injury from such causes as excessive pressure from within, underground lines too close to surface, etc. There are special hazards relating to improper markings of lines and valves, lack of proper clearance from underground pipe lines and overhead lines. Precautions should be taken for the proper location of valves, which may involve hazards relating to ladders or stairs, and platforms for safe access; shutoff valves accessible in case of fire or explosion; the extension of valve stems through walls to safe places; and proper valve indicators. Other possible hazards in this classification are valve pits, as related to good construction and ventilation. Valves also should be properly located as regards the proximity of high pressure lines to lines not designed to carry high pressure; and the provision of reducing and safety valves is important. Other problems are proper automatic valves for shutting off fuel lines to furnaces if the fuel supply should fail; and safe draining in case of overflow.

There are many safety problems relating to buildings, including walls, roofs and roof trusses, structures and floors, provisions for cleaning floors if hazardous materials are handled on them, avoidance of ledges to catch dust, proper exits to meet fire and other emergencies, safe stairways, proper rails to lessen fall hazards, and permanent ladders and platforms to give access to out of way places.

There are important problems relating to heat and ventilation, including temperature and humidity control, effect of doors and elevator shafts in avoiding drafts on persons, and the effect of boilers in the heating and ventilation problem.

Other important problems are proper lighting of buildings; safety and health problems which relate to lockers, toilets, washrooms and drinking water; power supply; and safety problems relating to elevators, cranes, derricks and hoists, conveyors, mechanical power and transmission.

There are some important safety suggestions relating to exhaust systems:

(a) Catch dust and fumes at source and do not permit handling of materials in the open, or handling poisonous substances unnecessarily.
(b) Properly designed hoods.
(c) Correct size and layout of pipes; avoidance of sharp bends.
(d) Proper size of fan.
(e) Collector or trap at discharge.
(f) Discharge outside of workroom and where no nuisance is created.
(g) Protection against static or other sparks if combustible dust is handled:
    1. Explosion doors in ducts (fire damper.)
(h) Use of separate room or building for dangerous processes.
(i) Provision for testing system.

Here is another suggestive check list for a chemical plant or department:

A. Possibility of explosions.

1. In tanks and portable containers for volatile liquids.
2. In special apparatus wherein sudden violent reactions may occur.
3. Because of close proximity to open flames or sparking electrical equipment.
4. Because of static electricity in belts and flow of powdered material or liquid.
5. Because of excessive pressure (in stills, blow cases and autoclaves.)

B. Control of chemicals or other hazardous materials.

1. Valves and cocks to indicate whether open or closed.
2. Pipe lines arranged so they can be easily traced.
3. Pipe lines painted or marked distinctively.
4. Adequate provision of indicators such as thermometers, pressure gauges, and sight glasses.
5. Important control valves to be placed within reach of operator and not so widely separated that he must lose valuable time reaching them in an emergency.
6. Sufficient number of valves where a single valve giving way would cause hazard.
7. Safety cut-offs (pipe joints that may be easily disconnected) at points where the accidental introduction of a chemical would cause a violent reaction.
8. Hoods or shields above valve stems conveying acids or other corrosive liquids under pressure.
9. Catch-basin or drip for tanks or other containers holding corrosive liquids.

C. Apparatus having explosion possibilities not placed too close to important structural supports.

D. Showers for workers if burned.

It is assumed, of course, that the safety engineer of a chemical plant should develop a check list which applies to his own specialized operations. Such a check list may be gradually developed and will become invaluable when there are new plant constructions or improvements.

## *Equipment Bulletins*

Combustion Engineering Corp., 200 Madison Ave., N. Y. City, reprint of an article, "X-Ray Examination of Welded Pressure Vessel Seams" by A. J. Moses, superintendent, Hedges-Walsh-Weidner, Chattanooga, Tenn., appearing in "Combustion" magazine.

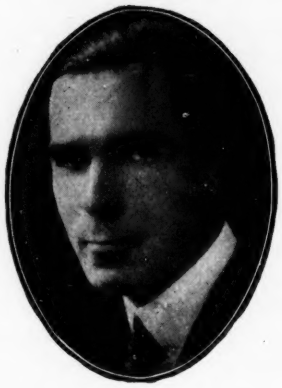
Fisher Scientific Co., Pittsburgh, Number 4 of Volume 4, "The Laboratory" contains a very short interesting description of the evolution of the microscope.

E. F. Houghton & Co., Philadelphia, 150 page catalog of "Vim" efficiency drives together with a wealth of engineering data. A particularly valuable contribution to the bookshelf of engineers and plant operating officials.

Quigey Co., 56 W. 45 St., N. Y. City, new attractive 4 page leaflet describes Pyro-Mortar, a dry refractory cement.

F. J. Stokes Machine Co., Olney Post Office, Philadelphia, has just released Bulletin 149a, describing new high vacuum pump for all vacuum purposes. Contains detailed engineering data.

# Safe Disposal of Industrial Chemical Wastes*



By E. B. Besselievre[1]

PURE air to breathe, pure water to drink and clear skies for clear vision are the natural heritage of mankind. Any encroachment upon these prerogatives is not consistent with the spirit of true civilization. The dangers to health attributable to industrial pollution are legion, and in this paper one cannot do more than give a brief resume of these dangers and a suggestion as to their remedy.

Industrial wastes are discharged in three general forms: solids, gases, liquids. Each of these has its definite effect on the health and comfort of those resident nearby. There is a fourth sub-class of wastes that are chiefly liquid, but carry a certain proportion of solids, both components being deleterious in different ways. It is best to take each one of these classes separately and consider the sources and components, and their effect.

Solid wastes are usually the scraps remaining from the process work in the plant, or by-products of the plant. Some are thrown out in a solid form and remain stable, the problem of their final disposal being a place to put them out of sight. Combustible wastes in the solid form may be readily burned in municipal or private refuse incinerators. Some solid wastes, such as saw mill refuse, may readily be used as fuel. Usually, also wastes of this type may be suitably disposed of by dumping in low spots and covering with earth.

### Decomposable Wastes Dangerous

Wastes of a solid nature, that are in themselves decomposable or contain decomposable elements, are a far more serious problem and require different handling. If such wastes are allowed to lie around in uncovered piles, they will soon cause obnoxious odors and arouse complaints and causes of civil action. Organic solid wastes may be adequately disposed of in some instances by putting them in closed receptacles and allowing them to undergo their natural process of decomposition. Under certain circumstances, such solid wastes in the process of this digestion produce a large volume of gas. This gas has a high calorific value and may be utilized in producing power or used as fuel under boilers, etc.

Solid wastes, such as slag from furnaces, scraps of iron and other metal, tailings from metallurgical operations, may be disposed of as fill. If this is done sensibly, low, swampy places may be reclaimed and be the source of considerable revenue for factory sites. Judicious piling of this material to a height consistent with the surrounding ground elevation will neither cause obstructions to traffic nor be obnoxious to the eye, and, on the other hand, may open up new avenues of approach to land developments, thus saving time for those who reside or work in the vicinity. A noteworthy example of this type of disposal of a solid waste is at the plant of the Martin Dennis Company, at Kearney, N. J., where, by means of a system of industrial railways, they have reclaimed a number of acres of swamp land adjacent to their plant, thus making for themselves and their neighbors a much more presentable terrain, reducing mosquito nuisance and adding valuable building areas.

Indiscriminate piling of wastes serves no useful purpose. The huge piles of waste phosphate rock in Florida, the tailings piles at the copper mines, the waste piles at Syracuse, N. Y., are mute evidence of misplaced disposal. There is low and waste land in the vicinity of any of these places that could be restored to useful and productive purpose by careful and studied dumping. Health officials can have no jurisdiction over such affairs, but municipal authorities can logically exercise some measure of control over these waste dumps.

Gaseous wastes are usually the result of processes involving combustion, either of fuels for power and heating purposes, or for roasting of ores, smelting of metals, gas manufacturing, acid manufacturing plants, incinerators and the like. In many of them the gases thrown off are visible, being colored the familiar

[1]Sanitary Engineer, The Dorr Co.
*Abstracts from paper read before National Safety Council Meeting.

yellow of sulphur, black when soft coal is used, and the white ash-laden smoke of an incinerator improperly operated. Flora in the vicinity quickly show evidence of such pollution, trees and plants dying, and soon there is a dearth of foliage round about. Seeing the effect on foliage, one must needs appreciate the great danger there must be to the human system from such fumes and gases. Inhalation of these noxious fumes cannot be helped, and surely, the inhabitants of a vicinity should not be compelled to go around with gas masks clamped to their mouths. This is one field where the health authority may, and usually does, assert his jurisdiction, and the result is a clean-up.

Municipal refuse incinerators are in many cases notorious performers in the discharge of smoke carrying odors of unconsumed garbage, many small particles of ash which settle in a pall over the countryside and constitute a fire menace, as well as a menace to comfort and health. Where the incinerators are one of a recognized group, this is due entirely to faulty operation. Experience has proven that when the furnaces of municipal garbage and refuse incinerators are kept at a heat of between 1200 and 1400 degrees F, perfect combustion of the refuse will result, there will be no smoke, no odors and no powdery ash. Allowing the heat to drop below the danger point of 1200 is due to carelessness, insufficient combustible material to maintain the heat or lack of care in the mixture of garbage and rubbish.

All gaseous wastes may be readily controlled. Frequently a check-up in the plant itself will disclose leaks, and sloppy operations, which, when corrected, will modify the trouble to a marked degree. Odor-destroying devices have been developed and are in successful use. Washing of gases and fumes will frequently suffice to remove solids in suspension in the gas. A number of successful plants are now functioning where plain settling tanks have been employed to recover flue dust, and several types of scrubbers are in use in gas plants that will reduce the odor nuisance. The use of chlorine has been found effective in a number of cases in preventing stack odors. Usually, a scrubbing or washing operation will remove sufficient of any suspended matter in the smoke or gas to remove the cause of complaint.

### Liquid Wastes Most Troublesome

Liquid wastes are, of the three main types, the worst to handle, are the greatest in number and present the greatest problems to the engineer and chemist. Because the nearest stream is usually the means of disposal first considered, the pollution is immediately transmitted to an innumerable body of innocent humans and animals who either depend upon these streams for their source of potable water, or for industrial purposes or for watering stock Liquid wastes are usually large in volume and contain a great array of materials which may be classed as pollutants. Some of these elements are in suspension, some in solution and vary in color and concentration. It is not necessary that the large volume of water usually discharged from industrial plants be diverted from the stream because of pollution, but, rather, it is essential that the pollution be removed. Large volumes of water taken from a stream and used in the various industrial plants that line its banks should logically be returned to that stream after use. The common law says that it must be in the same volume and condition. An example of this policy of diverting water from a stream was evident in the Passaic River, in New Jersey, until recent years. The large textile mills at Passaic, Paterson and the other towns along this river required enormous volumes of water each day, one plant alone taking 15 millions of gallons each day, enough water to satisfy an ordinary city of 150,000 people for its normal uses. The total reduction of the river flow through the pipe line used by these textile mills was so great that, except at flood times, when the dam overflowed, the river bed ran almost dry and was a sore sight, being the recipient of all manner of debris. Regulation of this by requiring the users to return a certain proportion of the water used to the river has again resulted in the Passaic being classable as a river.

### Water As a Disposable Agent

It is true that in many plants a large volume of water is used in cooling and other purposes which may not entail contamination. This water can be, and usually is, discharged directly to the stream, if found to be safe. On the other hand, it is sometimes more economical to treat wastes which are highly charged with pollutants than a highly concentrated waste, and in a number of instances it has been found advantageous to combine some of this clear water with the wastes, in order to obtain the reaction that an alkaline water will produce on an acid waste. This method may in certain cases save considerable money. For instance, where color removal is the desideratum, and as in dye manufacturing wastes or textile plants, it is difficult and expensive to remove the last trace of color by chemical means, the lighter shades of color may be entirely dissipated in a large volume of clear water, so that the resultant discharge to the stream is safe and unnoticed. To overlook this is perhaps to cause an unwarranted burden of expense.

Many liquid wastes are menaces to health because of their content of organic solids. These settle out in the stream, and, due to their avidity for oxygen, soon make the stream odorous and destroy the use of the water for potable purposes. By reducing the oxygen content, fish life is endangered or destroyed and bivalves are rendered unsafe to eat. Many of the famous oyster beds of the country have been

closed down, due entirely to pollution, either from industrial plants or municipal sewage.

Where there is concentration of industry in a given locality, splendid results may be obtained by the provision of a common fund, by the members of the industry, to finance the experimental work necessary to develop a successful and economical method of treatment for the wastes of a given industry. Co-operation of these groups with state health officials is usual, and it is a wise move, as it serves not only to forestall action, but to call the attention of the state to the problem and to keep them posted as to the efforts of the polluters to find a remedy.

The tanners of Pennsylvania, in combination with the State Water Board, have done a noteworthy piece of work in investigating the treatment of wastes from tanneries located on small streams. The coke manufacturers, due to the intensified pollution caused by the phenols in their wastes, have spent large sums in endeavoring to find means of relieving this trouble. Processes of absorption and evaporation have been the result. The paper and paper pulp manufacturers, who have a problem of large volumes containing high percentages of waste fibre and sulphite liquors, have been working for years under intelligent guidance and in harmony with the officials of Michigan and Wisconsin, and have had marked success.

The meat packers have done a great deal of work in Chicago, Fort Worth and other places to develop a means of handling their wastes. In one instance this has resulted in the development of a method of treatment which, shows a considerable annual profit in the recovery of valuable by-products and their use as hog feed and fertilizer. More and more of this concerted action will undoubtedly be done and eventually all large industrial organizations will be brought to see the advantages of research properly conducted.

Success in waste treatment is only a success when it is economical. Many times it has been found that wastes could be treated to reduce the color or the suspense to a minimum, but that when all the figures were cast up, it would be business suicide for the plant owner to attempt to carry out the treatment. That is why intelligent investigation of a problem is so important, research is a cardinal factor and thorough cooperation between the health officials, the plant owners, and the consultant will eventually produce a result satisfactory to all.

### Progress in Hydrogenation

October tenth issue of Chemical Age (London) carries the following important announcement on oil from coal costs at the I. C. I. Billingham plant indicating how much must still be accomplished before the process becomes competitive.

"It has been officially announced at the Office of Imperial Chemical Industries, Ltd., Billingham-on-Tees, that "petrol of a quality equal, if not superior, to the finest natural spirit can now be made from coal at a cost of 7d. per gallon." The present price to private consumers of No. 1 petrol is 1s. 3½d. per gallon, including tax, at which price similar quality spirit could therefore be manufactured from British coal, and retailed to the public to show a profit on the undertaking. It is estimated that the Imperial Chemical Industries' scheme, which envisages the manufacture of 213,000 tons of petrol per year, would involve a capital outlay of £7,000,000 to £8,000,000, provide employment for 5,000 men, and absorb 850,000 tons of coal annually. The success of the process would, of course, involve the Exchequer in a net loss of some £1,500,000 per annum on account of reduced receipts from petrol duty, but against this must be placed the direct and indirect saving on the Unemployment Insurance Fund, the stimulus of a prosperous industry in a depressed area, and the decreased payment of British money for foreign oils."

## *New Incorporations*

Regent Oil Co., Newark, petroleum products—Maxwell E. Levenson, Newark, 50,000.

Western Continent Minerals, Ltd., Philadelphia, Pa., deal in helium gas, carbon dioxide and all radio active gasses—Corporation Guarantee and Trust Co., 5,000 com.

Lesser & Co., Albany, chemicals—Toohey & Noonan, Albany, 500 com.

E. Tosse & Co. Inc., Brooklyn, N. Y., pharmaceutical products—Registrar and Transfer Co., $12,500; 100,000 com.

Lycoming Producing Corp., Wilmington, Del., natural and artificial gas—Corporation Trust Co., 140,000 com.

The Wyoming Sulphur Compound Co., Wilmington, Del., sulphur—Colonial Charter Co., Wilmington, Del., $150,000; 3,500 com.

### Ammonia in Sewage

Editor, Chemical Markets:

In your August issue appears a very interesting article on the Lime-Chlorine Treatment of Sewage by Mr. W. V. Brumbaugh, Assistant Secretary of the National Lime Association. In this article Mr. Brumbaugh states:

> "The addition of lime increases the alkalinity of the sewage at the point of application of the chlorine, which results in the chemical formation of the compound known as monochloramine from the ammonia naturally present in sewage. Monochloramine gradually changes to dichloramine, both compounds being effective and persistent in sewage disinfection."

While it is quite possible that in the sewage to be treated there is Ammonia in a form available for combination with the Chlorine to form the Chloramines, it should be pointed out that an Ammonia analysis of the sewage does not give a true indication of the amount of Ammonia in the form with which the chlorine will combine. Several authorities have pointed out that it is seldom that a sewage will contain as much free Ammonia as is reported by the analyses now in use, for in these analytical methods some of the nitrogenous substances in the sewage are converted into Ammonium Salts and the results reported as available Ammonia are, therefore, high.

Therefore, if it is desired to insure the formation of sufficient chloramines for the more effective sterilization of the sewage, corrections must be made for the error in the method of analysis and sufficient free Ammonia in the form of Anhydrous Ammonia or Aqua Ammonia added to insure the formation of the chloramines.

Philadelphia, Sept. 30, 1931. L. H. Brandt,
National Ammonia Company, Inc.

Miike Nitrogen Industry Co., Ltd., capitalized at 10,000,000 yen, has been formed by Mitsui Mining and the Electro-Chemical Co., to manufacture 30,000 tons of ammonium sulfate each year at the Miike coke factory at Omudu, Kyushu, and an ammonium sulfate plant in the suburbs of Yokosuka, near Yokohama.

# *Chemical Facts and Figures*

**I. C. C. Refuses Rate Increase—Chemical Industry Mobilizes for Unemployment Relief—Muscle Shoals Commission Outlines Policies—Dye Census Discontinued—George M. Eno Dies—U. S. I. Files Briefs—New Bichromate Producer.**

Interstate Commerce Commission, Oct. 20, denies the carriers' plea for horizontal 15% increase in freight rates. Commission, takes definite cognizance of position taken by majority of protestants heard and specifically by chemical industry's spokesman, Harry M. Mabey that while belief is general in the plight of certain of the railroads, a general horizontal increase would serve only to aggrevate rather than alleviate such condition. Mabey, in his testimony, August 10 (See Chemical Markets, Sept., p 289) stressed the fact that he was appearing, not as an unfriendly witness against the railroads, but as a servant of the Court to give advice and expert opinion as to the affects of such action upon one of the nations greatest industries.

"The protests," says the decision, "are not animated by the ordinary and natural antagonism to any increase, but very largely by a sincere conviction that harm rather than good would result therefrom, both to the country generally and to the carriers."

## Rail Executives Rebuked

The Commission rebukes rail executives for refusal to call the traffic experts to the stand to substantiate general statements made concerning plight of the roads and further, to aid the Commission in the determination of whether or not these increases were practicable of application so as to really produce added revenues. "There are competent traffic officers in all the districts who represent the carriers collectively, and could have been used as a means of concentrating and assembling this information. Not only did the carriers fail to present such witness, but in several instances they refused to produce traffic officers whom protestants wished to call to the stand for the purpose of proving their case in opposition."

The Commission criticises the railroads for not adopting drastic measures to set their own houses in order before appealing for aid in the form of a 15% increase in rates. It suggests, among other things, that the railroads have established rates often below the maximum reasonable rates fixed by the Commission; suggests the abandonment by some lines of all passenger business; urges further pooling of passenger traffic, and points out that, "At a time when as an industry they have new enemies to face, their warfare with each other has grown more bitter, so that economies in operation have been offset in part by the growth of competitive waste." Commission admits seriousness of truck competition. It sets forth opinion that much short haul traffic is definitely lost, but points out that carriers have long maintained that this business was usually unprofitable.

**Harry M. Mabey**
**Industry's freight rate spokesman**

***THE MONTH REVIEWED***

Oct.

| | |
|---|---|
| 5 | U. S. I. starts "Pyro" radio broadcasting (rotogravure) |
| 7 | Muscle Shoals Commission outlines policies (498). |
| 11 | George M. Eno, former Grasselli eastern manager, dies (502). |
| 13 | National Safety Council holds annual meeting (489). |
| 18 | Hercules announces consolidation of Paper Makers Chemical (499). |
| 20 | I. C. C. refuses 15% freight increase (497). |
| 22 | Brig. Gen. Herman A. Metz honored at luncheon (502). |
| 23 | Du Pont announces 32d quarter earnings statement (506). |
| 23 | Horace M. Bowker organizes chemical relief division (498). |

## Relief Need Recognized

Recognizing, however, that weaker roads are imminently in danger of not being able to meet their fixed charges, the Commission in so many words says to the carriers as a group, "We will permit certain specific increases which we are already in agreement on, such increases it is estimated to increase the nation's annual freight bill by $100,000,000 or $125,000,000, providing the carriers will consider such raises as surcharges and pool this fund for the benefit of poorer lines, but only as a temporary measure for the period of this emergency."

At first openly hostile to such a plan, rail executives meeting at Atlantic City, Oct. 22, vote to accept (urged, it is reported, by banking interests generally) the basis of the I. C. C. plan, appointing a committee to seek a change making the pool funds loans, rather than gifts. The carriers have until Dec. 1, to accept or reject the Commission's radical and unprecedented proposal.

## Chemical Industry's Part

Leaders of chemical industry are praising prominent part played by Manufacturing Chemists' Association and National Fertilizer Association. For the first time in history of the industry freight rate matters are accorded the proper attention they deserve and the industry's traffic experts given support of a united front.

A great deal of this lack of past interest is laid to widespread, but highly erroneous belief that the Interstate Commerce Commission is charged with the duty of protecting the public against selfish actions of the carriers. While such quasi-legislative powers were supposed to belong to the Commission at its inception in the eighties, Congress repeatedly has gone on record that the Commission is responsible for maintaining the railroads in an efficient state by control of the carriers' rates and practices. If anything, the Commission is supposed to exercise the benevolent attitude of guardian towards its charges. It is solely a judicial body. As such, it would have been forced to accept the plea of the railroads for the 15% increase only for shippers' appearance in opposition

who constructed a formidable case against the granting of the request. The Commission is compelled by law to make its decisions solely on the record and not on personal beliefs of members.

Railroad stocks' spurt late in the afternoon of Oct. 20, is laid to a leak of portions of the Commission's decision suggesting the $100,000,000 increase. While rail securities tumbled the following day, general concensus of opinion appears that carriers obtain as much as they reasonably should expect to receive and that a bad situation is improved by the initiative of the Commission. While a 15% increase would net $400,000,000 or higher, it is felt that carriers will accept a compromise agreement with the Commission. Commission feels that the most acceptable and quickest possible method of aiding roads is by improving business. Restoration of confidence badly shaken in rail securities is one of the first steps necessary.

## Proposed Increases

In its decision, Interstate Commerce Commission suggests certain commodities on which increases might be conditionally granted and others on which it would refuse rises. These items are:

No Increase—Practically all agricultural products, notably the grains, cotton, most fruits, cattle, sheep and hogs.

Three Dollars Per Car—Anthracite and bituminous coal, coke, iron, copper and zinc ores, stone, pulpwood, lumber, shingles, lath and products of forests, not otherwise specified.

Six Dollars Per Car—Phosphate rock, pig iron, scrap iron, scrap steel, rough and finished stone, artificial stone, crude petroleum and asphalt (natural, by-products or petroleum).

One Cent Per 100 Pounds—Cottonseed oil and cake, oranges, lemons, grapefruit, fresh vegetables not otherwise specified, dried fruits and vegetables, resin, turpentine, petroleum oils, lubricating oils, cement, brick, building tile, lime, ice and fertilizers, not otherwise specified.

Two Cents Per 100 Pounds—All other commodities, including all less-than-carload freight.

## Business Stability

When it is realized that freight charges represent in a great many industries the third largest single item of manufacturing expense, raw materials and labor usually constituting the first two, it is at once apparent what a general increase in freight rates would have meant to industry generally. Besides important but intangible losses due to a temporary cessation of business while readjustments of prices to take care of the rate advance were figured, would occur. The stability of business would have been seriously interrupted. To what degree of course it is impossible to say.

## *COMING EVENTS*

**American Association of Textile Chemists,** Boston, Dec. 4-5.

**American Institute of Chemical Engineers,** Atlantic City Dec 9-11.

**American Paint and Varnish Manufacturer's Association,** Drake Hotel, Chicago, Dec. 2-3.

**American Scientific Congress,** Mexico City, Feb. 5, 1932.

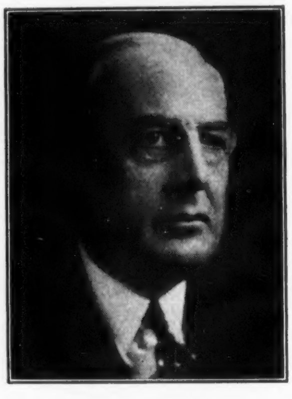
**Grasselli Medal Presentation,** Hotel New Yorker, Nov. 6.

**Materials Handling Exposition,** New York City, Nov. 30.-Dec. 5.

**Third International Conference Bituminous Coal,** Pittsburgh, Nov. 16-21.

## Relief Mobilized

Chemical, Drug and Paint Division of the Emergency Unemployment Relief Committee of the City of New York is organized at a luncheon, Oct. 23, with Horace Bowker as chairman, a position which he filled admirably last year.



**Horace Bowker issues relief orders to aides**

assisting Mr. Bowker are, George A. Benington, vice-chairman; A. W. Goeller, treasurer and the following prominent leaders of the chemical and allied industries; C. E. Adams, Air Reduction President; F. M. Allen, President; Mathieson Alkali, R. T. Baldwin, Chemist Club Secretary; William S. Gray, Glenn Haskell, Vice-President, U. S. I.; Williams Haynes, Publisher, Chemical Markets; L. S. Kohnstamm, Holland R. Wemple, Sales Manager, Texas Gulf Sulfur, F. G. Zinsser, and Dr. J. Leon Lascoff.

Also P. C. Magnus, James A. McNulty, Eugene L. Norton, Freeport, Texas President; E. S. Phillips, President, Devoe & Reynolds, Arthur S. Somers, Dr. Maximilian Toch and W. J. Kramer.

Believing the need to be greater this year than last, Chairman Bowker laid before his Committee comprehensive plans for complete coverage of those profitably employed in the chemical and allied lines, urging all to stress the slogan, "I Will Share."

## Shoals Policies Defined

W. R. Hobbs and his State-Federal Muscle Shoals Commission associates meet in Washington, Oct. 7 and adopt three general principles, largely for their own guidance but which appear to forecast serious trouble for the fertilizer industry at the Congressional Session starting Dec. 1.

The commission's conclusions include the following statements:

"It is economically feasible and desirable to use and operate the Muscle Shoals properties for the following purposes:

(1) Quantity production and manufacture of types of commercial fertilizer of greater concentration than those which are now sold to the farmer.

(2) Co-operative scientific research and experimental practices by agricultural agencies, national, State, and county, for the development of scientific methods of improvement of soil fertility and for introduction of methods so developed among fertilizer users.

(3) Establishment of industrial chemical operations as an essential adjunct to fertilizer production.

It is the definite conclusion of the commission that the foregoing public benefits can best be obtained by private operation under lease contracts through competitive negotiations.

Commission further believes that fertilizer and chemical production should have first call on electric power produced, remainder to be sold at the switch-board, and profits given to research in manufacturing, using fertilizer, financing storage, and distribution of fertilizer. It is proposed to negotiate a lease for fifty years, the price to be readjusted after ten years, with requirements as to the minimum amount of fertilizer to be produced and the profit to be derived from sale of fertilizer.

One rumor thought to be well-founded—the possibility that the Commission would recommend Presidential action on the Shoal's final disposition, without congress's consent is emphatically denied.

"The Muscle Shoals Commission is adhering to its original purpose of working out a fair, sound and feasible plan" for Muscle Shoals according to a statement made public Oct. 5, on behalf of the Commission by Col. Joseph I. McMullen, who represents the Department of War on the Commission.

"Recent impressions that the Commission contemplated leasing or sale of the property without further action by Congress are erroneous."

Du Pont salaried employes are placed on a five-day week beginning November 1, with a 10% cut in wages. About 8,680 employes, including 1,900 in Wilmington, are affected.

While the readjustment applies to the parent company, directors of subsidiaries are directed to consider the plan, either by omitting Saturday as a working day or staggering the work.

### New Bichromate Producer

Standard Chromate Co., announces volume production of bichromate of soda at it's new plant at Painesville, Ohio. Plant is located at a strategic position on trunk railway systems, with dock facilities for Great Lakes transportation.

Sponsors point to their plant as an assembly of modernized equipment, claiming for their process a completely mechanical method of ore reduction, and the consequent output as one bearing characteristics of uniformly high purity, so essential to the consuming trades.

Erection of plant is said to be a signal achievement in plant construction for its specific purpose, and probably establishes, as well, a new mark in elapsed time for erection of a similar project. Contractors first broke ground in May of the present year.

Stocks are available in principal cities throughout the country. H. B. Prior Co., Graybar Building, 420 Lexington Ave., N. Y. City, is appointed selling agents.

Approximately 3500 tons of structural building steel have been fabricated by Austin, in the past year, announces Harry E. Stitt, chief engineer. This tonnage includes ten contracts, and is by far the largest volume of welding in the company's experience. It represents nearly $3,000,000 in building construction.

Sales of R & H rubber accelerators: R & H No. 40, R & H No. 50, R & H No. 397 are transferred to rubber chemical section of du Pont's dyestuffs Department. Sale of diphenylguanidine, hexamethylenetetramine and aldehyde ammonia will be continued as before from the different R & H Sales Offices. R & H Rubber Service Laboratory has now been consolidated with the du Pont Laboratory.

Glyco Products Bush Terminal Bldg. No. 5, Brooklyn, N. Y. announces they are now producing a paste form of "rub-less" polish, containing a minimum water content. This paste is dispersed in one or more parts of water to give fluid non-separating emulsion. This emulsion being composed of carnauba wax and hard resins makes a durable, water-repellent polish.

Sulfur rights on large leased acreage in Jefferson County owned by Gulf Production Co. (Gulf Oil) are purchased by Texas Gulf Sulphur.

## *Company News*

Russell H. Dunham, president Hercules Powder announces on October 18, negotiations finally completed for the consolidation of the Paper Makers Chemical Corp. with the Hercules company.

The announcement says Paper Makers Chemical would continue to operate under its own name and with its present organization, headed by W. J. Lawrence of Kalmazoo, Mich., president.

The consolidation, Mr. Dunham states, will afford both companies increased technical and physical resources for serving present and future customers.

Paper Makers Chemical, with headquarters at Kalamazoo and fifteen plants in various parts of the country, supplies various chemicals to the paper industry and is a manufacturer and jobber of several industrial chemicals. It operates as subsidiaries Paper Makers Chemicals, Ltd., of Erith, England, and Vera Chemical Company of Freeman, Ont.

Mr. Dunham states, consolidation makes available to Paper Makers Chemical an international marketing organization, extensive chemical research facilities and an increased line of paper-making chemicals and materials.

F. C. Bersworth Laboratories, Framingham, Mass. is now in commercial operation for the manufacture of ethylene diamine on a fairly large scale. It is to be noted that ethylene diamine may now be obtained in any quantity and at a sufficiently low price to allow it to be investigated by commercial chemists with a view for using it in the regular process work. The F. C. Bersworth Laboratories are marketing that product in solutions containing from 50 to 95% free base.

The Trojan Powder Co., a New York corporation, with principal offices at Pulaski, Va., with H. H. Roberts agent in charge, is granted a certificate of authority by the State Corporation Commission to manufacture and sell gun and blasting powder.

American Cyanamid of which Holston River Power is a subsidiary, is renewing option on 2,100 acres near Kingsport, Tenn. The land is known as the D. & W. Roller home farm. The option will continue until September 20, 1932.

If the land is bought, Cyanamid will erect a large electrochemical industry on it. The site is south of the south fork of Holston River, two miles from Kingsport.

Union Carbide & Carbon, through its subsidiary, Carbide & Carbon Chemicals, is contracting to supply R. C. A. Victor Vinylite resin to be used in molding Vitrolac records, which on same size disc will play several times as long as old type records.

Koppers Research Corp., subsidiary of Koppers Co. is marketing a new soap product under the name of Koppers Thylox Sulfur Soap.

Atlas Powder Co., reduces salaries of employes and officers 10 per cent., effective November 1.

Royster Guano is granted by Judge Coleman of Norfolk County Circuit Court, a reduction in the valuation of the concern's buildings from $200,000 to $138,000.

Allied is receiving an income tax refund of $113,027 for the years 1927 and 1928.

Anaconda Copper Co., starts up its phosphate property at Conda, Idaho, after three months' shutdown. About 300 men are employed. Phosphate rock mined at Conda is shipped to Anaconda and converted into triple superphosphate.

American Zeolite Corp., manufacturers of Decalso, material used in softening water is acquired October 1, 1931, through stock ownership by the General Water Treatment Corp. The business will be operated by the American Zeolite Corp. as a unit of the General Water Treatment Corp. with offices at 440 Fourth ave., N. Y. City.

*Arthur Barba Sr., president, throws, October 28, first spade of earth for foundations of the sulfur production plant, Jefferson Lake Oil Co., near Abbeville, La.*

## *Washington*

Nitrogen and freight rates hold center of attention for chemical Washington during October, both situations being treated at length elsewhere. Washington economy strikes body blow at the industry with the announcement, Oct. 14, of the discontinuance of the annual census of dyes and other synthetic organic chemicals. Close Hoover confident, Henry P. Fletcher, Tariff Commission Chairman, states that move is due in part to economy and also to inability of Commission to justify its work for the dye industry should it be criticized by others. Thus with the publication of the 1930 figures (sixteenth in the series) comes to an end one of the outstanding, worthwhile contributions of federal government to chemical industry.

**Warren N. Watson criticizes Tariff Commission**

Manufacturing Chemists' Association Secretary, Warren N. Watson, and onetime chairman of the chemical division of the Tariff Commission is quoted as saying:

"The organic census of the Tariff Commission occupies a unique position in the world's chemical statistical literature. No other country has compiled such a complete and detailed record of production and imports of a highly specialized group of chemicals, namely, the synthetic organic field. The census has been of inestimable value to the Ways and Means Committee of the House of Representatives and the Finance Committee of the Senate in the tariff revisions of 1922 and 1930, and has been intensely used in debates on the floor of the house and senate. In addition it has been of great importance to manufacturers in establishing a balanced production program, as it gives annual information on consumptive demands by products in the United States. On account of its highly specialized nature, organic chemists were necessary to supervise its compilation and prepare economic interpretations. It was in high demand in all European dye-producing countries on account of the complete statistical survey of the international dye trade.

"The discontinuation of this publication is a distinct loss to Congress and the American chemical industry. The producers feel that a serious mistake has been made by the commission in this unexpected decision. There is no discoverable demand for its abandonment, and the motives of the commission prompting this action are veiled in mystery."

### R & H Protest Rates

R & H files complaint with the I. C. C. protesting rate classification of peroxide of soda shipped in interstate commerce. Under Southern and Western classifications, is rated first class when packed in metal cans in barrels or boxes, less than carload lots, and second class when packed in bulk in iron or steel barrels, less than carloads. Complaint says first-class rates are unreasonable to extent that rating in less than carload lots in containers mentioned exceeds second-class rates.

### Copper Conference

Emile Franqui, Belgium Finance Minister and fellow traveller, Fernand Pisart, Belgian Congo copper miner extraordinary, representing Katanga mining interests, steam up New York Harbor on the Majestic and the long threatened copper conference is on.

Copper executives seek agreement on program for curtailing output of the metal. American producers are said to be agreed that curtailment plan should be sufficiently drastic to result in a steady reduction in supply stocks of copper. During recent months, supplies of the metal have been increasing steadily. In September, a gain of 26,441 tons in stocks of blister and refined copper was reported, and total stocks of the metal at the end of the month were 658,321 tons.

Last attempt at curtailment of output was made last June. It was unseccessful, however, and subsequently the price of copper broke to the present price of 7 cents a pound, lowest in the history of the industry. In November, 1930, a conference resulted in a 15 per cent curtailment program. This plan, producers have said, was inadequate.

"We come with an open mind," E. Franqui is quoted, "a further curtailment of 25 per cent would bring the production of Katanga properties down to about 40 per cent of maximum."

Informal discussions between Belgian producers and American copper executives may last for several weeks.

### Nitrate Producers Meet

European nitrate conference is concluded, October 28, following arrangements for liquidation of cartel fund. Chilean producers were not represented.

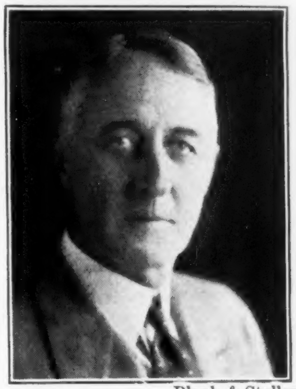
## *Personal*

Prof. Chas. E. Mullin, co-author of current articles on "Synthetic Acetic Acid" in Chemical Markets is on leave of absence from Clemson College to complete two new books, "The Chemical Constitution of Wool and Silk" and "Elementary Dyeing Laboratory Experiments for Textile Students."

Director Edward R. Weidlein, Mellon Institute of Industrial Research, is elected president of the University Club of Pittsburgh. He is also vice president Pittsburgh, Chamber of Commerce.

### Burgess, Perkin Medalist

Perkin Medal for 1932 is awarded to Dr. Charles F. Burgess of the Burgess Laboratories, Madison, Wisconsin, for his



Blank & Stoller

**Dr. Charles F. Burgess**
**Research in electrochemistry brings medal**

achievements in the field of electrochemistry. The medal will be presented to Dr. Burgess at a meeting in New York on January 8th.

Francis Chilson, consulting and packaging engineer, institutes special group consulting service for smaller chemical manufacturers whose annual sales run less than $500,000.

Governor Miller appoints Theodore Swann, member of Alabama Industrial Board for a period of twelve years.

Lina H. Enslow, chlorine expert, who served the Chlorine Institute, Inc., in an advisory capacity, is appointed editor of Water Works and Sewerage.

Solid Carbonic entertains at luncheon Dr. Rudolp Plank and his assistant, Dr. J. Kuprianoff of Karlshrue University, Germany at the duPont-Biltmore Hotel in Wilmington on October 22. Noted German scientist is on a tour of the U. S. and is particularly interested in the application of solid carbon dioxide, on which he is an eminent authority.

### Pupin Honored

One time Serbian immigrant, Dr. Michael I. Pupin, scientist, engineer, author, inventor and Columbia University professor is the recipient of the John Fritz Gold Medal, highest American engineering honor for 1932. The award, unanimous, is made by board representing four national societies of civil, mining and metallurgical, mechanical, and electrical engineers, having a membership of more than 60,000.

### Gen. Metz Celebrates

Brig. Gen. Herman A. Metz, General Dyestuffs President, and head of the Board of Trade for German-American Commerce is guest of honor at luncheon given by the last named organization at the Waldorf to celebrate the completion of 50 years of his business career. Speakers include U. S. Senator Royal S. Copeland, Dr. Gustav Heuser, Acting German Consul General; Bernard H. Ridder, Fritz Thyssen, German steel man, and Presiding Judge, Israel F. Fischer U. S. Customs Court. Eugene Hennigson acts as toastmaster.

**Brig. Gen. Herman A. Metz feted on 50th business anniversary**

Chemical industry is well represented by such prominent men as William J. Amend, Dr. Carlton Ellis, Wm. S. Gray, E. K. Halbach, Williams Haynes, Sidney Haskell, Percy Kuttroff, and George C. Lewis. Also A. L Mullaly, W. H. Martin,. E. R. Pickrell, H. H. Replogle, Dr. Maximilian Toch, and Dr. Walter Duisberg of Germany.

### Gantt Memorial Medal

Leon Pratt Alford is presented with the Henry Gantt Memorial Medal at a dinner Oct. 29, at the Pennsylvania. The Gantt Medal is given annually in recognition of outstanding accomplishment in management engineering in memory of Henry Laurence Gantt, leading contributor to the development of the science and art of management.

Two years ago the first medal struck was presented posthumously to Henry Laurence Gantt, and a year ago to Fred J. Miller, management engineer. The custodianship of the medal is held by the Gantt Medal Board consisting of representatives of The A. S. M. E. and Institute of Management, American Management Association.

Mr. Alford has devoted his life to the advancement of the art and science of management, as editor of technical periodicals, publisher of technical and business books, contributor of numerous papers before engineering societies, and as the author of books on management.

### Kavalco Replies

C. O. North, president of Kavalco Products Co., releases the following statement in reference to Monsanto's recent suit alleging illegal actions on the part of Kavalco and several of that company's officers.

"The Bill of Complaint alleges illegal use of secret processes, breach of contract, and accuses us of other nefarious practices, including that of making serious inroads in Monsanto's business. It is contended, among other things, that the technical men in our organization are not entitled to use their knowledge gained by experience and education in manufacturing chemicals. This is a principle which, if sustained, would deny all technical men the right to earn a livelihood by the pursuit of their chosen professions. Quite happily the Courts have decided a number of times that no such restraint can be placed upon individuals.

In this particular case one of the officers of Kavalco Products agreed in a contract not to manufacture rubber accelerators or rubber anti-oxidants. He has kept this agreement. So too, this company has scrupulously kept all contracts both in letter and in spirit. Its business has been built up entirely upon the merits of its products and the low cost of production resulting from applied research. This we consider to be fair competition and entirely in keeping with American business principles.

We submit to the consuming public that by our straightforward methods we are protecting their interests while at the same time advancing the interests of our company. We trust we may continue to receive the patronage and confidence of our friends and we assure them that, according to the opinion of our attorneys, there will be no interruption in the manufacture and sale of our products and that we will maintain the high standard of quality and business methods for which we have always contended."

Santa Rosa, New Mexico is the site of a development of what is said to be the largest known rock asphalt deposit in the United States. It has been explored for a length of twelve miles and a width of two miles.

## *Obituaries*

### George M. Eno

George M. Eno, former eastern sales head for Grasselli Chemical dies, Oct. 11, at his home in Brooklyn. From 1919 to 1928 he represented his company in the eastern section of the country and was known and beloved by a large circle of chemical business executives who mourn his loss. Mr. Eno entered the chemical business in 1890 as an employee of the old U. S. Chemical Co., of Philadelphia. In 1898 he went to the Standard Chemical Co., at Camden, and two years later, joined the Standard Milling & Chemical Co. From this company he went to Mechling Bros., and a few years later became president and general manager of

the Delaware Barytes & Chemical. In 1907 he joined the Grasselli organization as manager of the Philadelphia branch and in 1911 was made secretary of the eastern sales committee in New York City. In 1919 he succeeded to its Chairmanship. Ill health in 1928 brought to a close his active business career. Mr. Eno will long be remembered for his sterling qualities, as a fearless, but fair and generous competitor, a just, sympathetic, and inspiring leader, a firm and loyal friend, and as a constructive force of great magnitude in building up the chemical industry of this country.

John Troy, president, Manufacturers' Charcoal, Bradford, Pa., and prominent figure in wood chemical industry, died October 27, age of seventy-three years.

### Joseph M. Matthews

Joseph M. Matthews, authority on dyestuffs and Textile chemistry dies at San Diego at the age of 57 years. During and after the World War, when the American dyestuffs industry was being developed he defended the color manufacturers against criticism, and aided in research efforts to make American dyes successful.

He was born in Philadelphia on June 9, 1874, and educated at the University of Pennsylvania receiving the degree of Doctor of Philosophy there in 1898. He was head of the Department of Chemistry and Dyeing, Philadelphia Textile School

from 1898 to 1907. During the next three years he was manager of the dyeing department of the New England Cotton Yarn Co.

Since 1910 Dr. Matthews had been a consulting chemist and expert in textile chemistry and dyestuffs. He had been editor of Color Trade Journal since 1917. He was a member of the American Chemical Society, the Society of Dyers and Colorists of England, the National Research Council and other scientific groups and a fellow of the American Association for the Advancement of Science. He was a delegate to the International Congress of Applied Chemistry at each triennial meeting from 1903 to 1912. Dr. Matthews was author of several important books on Textile Chemistry.

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Walter F. Archer, superintendent Mathieson Alkali, Niagara Falls, and connected with that company for more than thirty-five years, dies following illness of five weeks. He was 60 years of age.

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## U. S. I. Files Brief

U. S Industrial Alcohol, U. S. Industrial Chemical and the Agricultural Chemical Co. file briefs in the United States District Court supporting their contention that indictments returned against the three companies and fifty other defendants are invalid.

The corporations aver that the presence of an unauthorized person in the grand jury room when the indictments were returned renders them void. They recite that Edward L. Koontz, a court stenographer was present before the jury and that while he had been commissioned as an Assistant United States Attorney he had never filed his commission with the clerk of the court.

The briefs add that Mr. Koontz took notes of the proceedings, which were transcribed by a person other than himself thus violating the secrecy of grand jury procedure.

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Prof. Albert B. Newman, Cooper Union chemical engineering head, New York City announces free night courses in in chemistry every Monday evening. He will lecture on "Unit Operations of Chemical Engineering". An opportunity for the chemical executive as well as the chemist and the engineer to catch up with latest developments.

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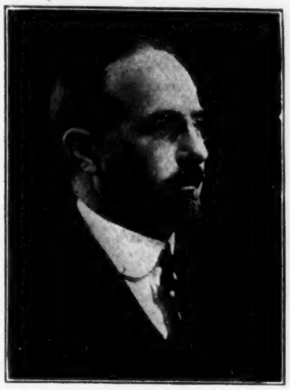
## Opens N. Y. Offices

Natural Products Refining announces opening of New York sales offices at 10 E. 40 St. in charge of E. T. Deutz for 22 years at the head of A. Klipstein & Co's., tanning materials department. The present sales arrangement between A. Klipstein and Natural Products Refining will remain undisturbed. Natural Products Refining is completing the new large addition to the Jersey City works.

## A. I. C. E. on Unemployment

Technological unemployment in chemical industry is to be the subject of detailed study, according to American Institute of Chemical Engineers, which appoints a committee, at request of Secretary of Labor Doak, to recommend ways



**Dr. J. V. N. Dorr**

**leads study of technological unemployment**

and means whereby Department of Labor may continuously assemble, analyze, and disseminate fundamental data on this subject, as instructed and authorized recently by Congress.

The committee formed by American Institute of Chemical Engineers to study this subject is headed by its Vice-President, Dr. John Van Nostrand Dorr, President, Dorr Co. Other members are Gustavus J. Esselen, Consulting Chemical Engineer, Boston; Crosby Field, President, Flakice Corp., Brooklyn; William H. Gesell, Vice-President, Lehn & Fink; William C. Geer, Research Chemist, Ithica, N. Y.; Dr. R. T. Haslam, Vice-President, Standard Oil Development Co., New York; Martin H. Ittner, Chief Chemist, Colgate Palmolive-Peet Co., Jersey City; Dr. W. S. Landis, Vice-President, American Cyanamid; C. E. Kenneth Mees, Director of Research and Development, Eastman Kodak; Charles M. A. Stine, Vice-President, duPont; and Frederick W. Willard, Asst. Works Manager, Western Electric Co., Newark.

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## Element 87 Discovered

Former elusive, research-defying element No. 87 is detected by Jacob Papish, Cornell professor of spectroscopy. Inflammable, solid, virtually priceless, it cannot be isolated from parent compound. Of the ninety-two elements in the physical universe all but Nos. 87 and 85 had been identified.

Only one element thus remains unknown. Element No. 87 is found in a lustrous, velvet black mineral called samarskite, which is worth about $2 a pound. Two million pounds of samarskite contain one pound of element No. 87, according to Professor Papish's calculations.

# *Personnel*

Henry M. Toch, Standard Varnish Chairman and for 50 years president, Toch Bros., Inc., resigns and is succeeded by his equally famous brother, Maximilian in the presidency of the company that bears the family name. Maximilian Toch, professor, lecturer, authority on photography, first to apply scientific tests for the authenticity of old paintings will remain vice-president of Standard Varnish. Dr. Maximilian Toch recently addressed the A. S. T. M., N. Y. District meeting, Nov. 5, on "The History of Protective Coatings."

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Charles H. Sabin, chairman of the board, Guaranty Trust, is elected a director of Air Reduction to succeed Robert C. Pruyn.

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John F. Ross severs connection with J. T. Baker Chemical to accept a position as research chemist for Mallinckrodt.

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Marshall Dill, San Francisco, announce appointment of L. Kraack to take charge of export and heavy chemical departments.

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Dr. William F. Talbot, formerly member teaching staff University of Iowa, and subsequently connected with Experimental Station of du Pont, at Wilmington, joins research staff of Gustavus J. Esselen, Boston.

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Mrs. Sara E. Ormsby, nationally known as the only successful chemical saleswoman and manager Milwaukee branch, Merchants Chemical since its establishment, severs her connection with that company and starts as a chemical broker and jobber.

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Faithful Emil Kuehnemann, Eimer & Amend employee for 50 years is guest of honor at a dinner tendered him by the corporation at Cavanagh's on West 23rd Street, New York City.

Mr. Kuehnemann, who is manager of the wholesale drug department, was presented by Dr. Otto P. Amend, President, on behalf of the company, with a check for $5,000.00 as a mark of appreciation for his fifty years of service.

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Harry J. Hosking resigns position in the Niagara Falls, R & H research laboratory to take up similar work with Foster D. Snell, Inc., 130 Clinton St., Brooklyn.

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E. W. McMullen is appointed superintendent of Ault & Wiborg Varnish Works, Inc., of Cincinnati. Mr. McMullen was for the past two years associated with the research department of the Celotex Co. at Chicago.

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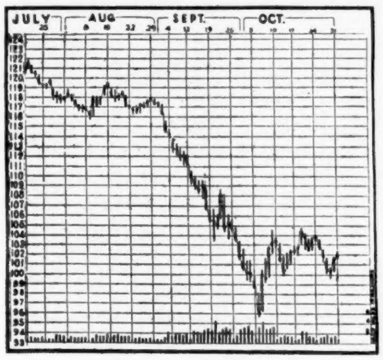
Schwenk Safety Device Corp. moves from 70 East Forty-fifth street to 27 Water street, N. Y. City.

# The Financial Markets

**Stock Values Appreciate Slightly in October—Du Pont Fails to Register Gain—P & G Proposes Preferred Stock Increase—Third Quarter Earnings Lower—Monsanto and Mathieson Make Favorable Showings.**

The month of October was one of appreciation. The final gains for the month, however, were small. A sustained rally in the first part of the month, based upon the announcement of a plan to release frozen credits was partly offset near the end of the month by profit taking and several items of bearish news including the denial of the freight rate increase by the I. C. C.




N. Y. Herald Tribune

The total appreciation for 240 issues, as recorded by the N. Y. Times, in October was $1,182,905,560, against a depreciation of $7,188,722,493 in September, which was the greatest shrinkage in values of any month since October, 1929, and against a depreciation of $2,585,135 in October, 1930. Last month's gain was the largest for any month since June, 1931.

## Chemical Stocks Advance

In the chemical group of nine leading companies seven managed to record an appreciation in their stock values. The important exception was duPont. This was due undoubtedly to the large holdings of General Motors held by the duPont Company. U. S. I. made a very good showing, while Va-Carolina Chemical recorded no change in either direction.

| | *Increase* | *Decrease* |
|---|---|---|
| Allied Chem & Dye | $8,704,669 | ...... |
| Comm Solvents Corp. | 3,162,610 | ...... |
| Davison Chemical Co. | 630.084 | ...... |
| Du Pont de Nemours & Co. | ...... | $4,149,625 |
| Mathieson Alkali Works | 2,113,793 | ...... |
| Texas Gulf Sulphur | 15,559,950 | ...... |
| Union Carbide & Carbon | 29,969,556 | ...... |
| U. S. Industrial Alcohol | 2,850,560 | ...... |
| Virginia-Carolina Chem. | ...... | ...... |
| Total | $62,991,222 | $4,149.625 |

## Av. Price Rises

Chemical Markets Average Stock Price reflected the slight gain made in common stocks during the month. The price stood on the five Fridays of October as follows: Oct. 2, $29.79; Oct. 9, $31.90; Oct. 16, $30.97; Oct. 23, $34.22; Oct. 30, $33.60. Compared with the last Friday in September, however, the group showed a slight loss, the Price standing on that day at $33.91 as against $33.60 for the end of October.

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Freeport Texas earnings continue to exceed current dividend requirements, Eugene L. Norton, president, states in a letter to stockholders. The company's financial position is strong, Mr. Norton adds.

Mr. Norton reports that Freeport Texas expects during the coming year to realize a return on its investment in the manganese property in Cuba. Substantial progress has been made in the development of the property and in the construction of the plant for the concentration of the manganese deposits, he states.

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New York Stock Exchange receives a notice from P & G of proposed increase in authorized preferred stock, series of February 1, 1929, to 250,000 shares, from 125,000 shares, by change of 125,000 shares of preferred stock series of June 1, 1930, into the same number of shares of the series of February 1, 1929, each old share to be exchanged for one new share.

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## Dividend Actions

Cleveland-Cliffs recent omission of the preferred dividend reflects the low level of activity of the company brought about by the decreased operations in the steel industry. While Cleveland-Cliffs has not been operating at a loss, earnings have been seriously impaired so that for the year they probably will not quite equal the amount of dividends so far paid out. Cleveland-Cliffs has disbursed this year two dividends of $1.25 each on the preferred stock and has made a payment of 25 cents on the common, or roughly $1, 330,000. For 1930 net profit was $4,886, 150 or $5.14 a share on 408,296 common shares, after preferred dividends.

American Potash & Chemical directors announce omission of the quarterly dividend ordinarily paid about Sept. 30 on the common stock, no par value. Previously, the company made regular quarterly distributions of 25c per share on this issue.

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Penick & Ford, declares extra dividend of 50 cents in addition to regular quarterly dividend of 25 cents, both payable December 14 to stock of record November 30.

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Merck Corp.'s action in declaring in advance two quarterly preferred dividends of $2 each to bring the year's declarations up to $8 a share, reflects earnings so far this year in excess of those of a year ago. The dividend action also indicates the confidence of the management that the full year's profit will exceed the $8.30 a share earned on the preferred stock in 1930. The company reports earnings only once a year.

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Oliver United Filters, omits quarterly dividend of 50 cents on cumulative convertible Class A stock due November 1.

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## Price Trend of Chemical Company Stocks

| *Name* | *Oct. 2* | *Oct. 9* | *Oct. 16* | *Oct. 23* | *Oct. 30* | *Oct. 30* |
|---|---|---|---|---|---|---|
| Allied Chem | 79½ | 78½ | 80 | 88¾ | 84½ | + 5 |
| Air Reduction | 60 | 64⅞ | 63 | 68 | 64½ | + 4½ |
| Anaconda | 15⅛ | 15⅝ | 14⅞ | 18⅝ | 15¼ | + ⅛ |
| Columbian Carbon | 38⅜ | 46 | 43 | 49½ | 46⅝ | +11⅛ |
| Comm. Solvents | 10⅝ | 11½ | 11⅜ | 12⅝ | 11⅝ | + 1 |
| Du Pont | 61¼ | 61⅛ | 57⅝ | 59⅞ | 58⅜ | —2 ⅛ |
| Standard of N. J. | 29¾ | 31⅞ | 31¾ | 33¾ | 33⅞ | +4 ⅛ |
| Texas Gulf | 22¼ | 25 | 24⅞ | 27¼ | 27¼ | + 5 |
| U. S. I. | 22¾ | 25⅛ | 24½ | 30⅞ | 32⅝ | + 9⅞ |

## Over the Counter Prices*

| | Bid | Asked |
|---|---|---|
| Am. Hard Rubber | 13½ | 18 |
| J. T. Baker Chem. | 10 | 14 |
| Dixon Crucible | 100 | 115 |
| Dry-Ice | .... | 30 |
| Merck pf | 62 | 66 |
| Solid Carbonic | 3 | 5 |
| Tubize B | 37 | 42 |
| Worcester Salt | 84 | 89 |

*Sept. 30.
†Dividend.

# Company Reports

## Du Pont 3rd Quarter Off Slightly

Du Pont, for nine months ended September 30, 1931, shows consolidated net income of $14,412,943 after interest, federal taxes, etc., equivalent after debenture dividends, to $3.34 a share (par $20) on 11,035,263 average number of common shares outstanding during the period. This compares with $45,984,659, or $3.88 a share on 10,700,970 average shares in first nine months of previous year.

Consolidated net income for quarter ended September 30, 1931, was $13,802,549 after charges and taxes, equal to $1.11 a share on 11,005,442 average common shares, comparing with $14,953,465, or $1.22 a share on 11,065,762 shares in preceding quarter and $13,033,345 or $1.05 a share on 11,009,774 average common shares in third quarter of 1930.

Consolidated income account for nine months ended September 30, 1931, compares as follows:

| | 1931 | 1930 | 1929 | 1928 |
|---|---|---|---|---|
| Oper inc | $17,444,168 | $19,540,038 | $26,354,416 | $15,920,630 |
| Inc G. M. inv | 22,458,930 | 25,452,530 | 35,455,453 | 32,939,995 |
| Other inc | 3,425,045 | 3,224,740 | 3,120,150 | *5,180,905 |
| Total inc | $43,328,143 | $48,217,308 | $64,930,019 | $54,041,530 |
| Fed'l tax | 1,860,892 | 2,178,120 | 3,303,296 | 1,699,272 |
| Interest | 54,308 | 54,529 | 60,480 | 63,579 |
| Net income | $41,412,943 | $45,984,659 | $61,566,243 | $52,278,679 |
| Deb divs | 4,582,485 | 4,478,985 | 4,350,581 | 3,944,520 |
| Com divs | 33,124,121 | 35,076,146 | 45,608,894 | 39,258,123 |
| Surplus | $3,706,337 | $6,429,528 | $11,606,768 | $9,076,036 |
| Surp beg yr | 208,082,665 | 144,920,215 | 105,710,319 | 97,785,244 |
| Reval G. M. invest | ...... | 22,457,745 | 24,953,050 | 19,962,440 |
| Surplus adj | 3,120 | ‡32,357,159 | ...... | ...... |
| Sale add deb stk | ...... | ...... | ...... | 1,218,900 |
| †Surp fr min int | ...... | ...... | 5,146,743 | ...... |
| P & L surp | 211,792,122 | 206,164,647 | 147,416,880 | 128,042,620 |

*Includes approximately $2,286,000 profit from sale of 114,000 shares of U. S. Steel common stock. †Surplus resulting from acquisition of minority interest in Du Pont Rayon Co., Du Pont Cellophane Co., Inc., and Du Pont Ammonia Corp., and entire interest in Krebs Pigment & Chemical Co. ‡Includes $7,767,060 surplus resulting from issue of common stock sold under executives' trust and bonus plans. $18,249,540 premium received from common stock issued under subscription offer and $6,340,559 surplus resulting from acquisition of Roessler & Hasslacher.

Consolidated income account for quarter ended September 30, 1931, compares as follows:

| | 1931 | 1930 | 1929 | 1928 |
|---|---|---|---|---|
| Oper inc | $6,188,962 | $4,834,721 | $9,569,517 | $6,059,047 |
| Inc G. M. inv | 7,487,465 | 7,487,465 | 10,505,322 | 12,972,267 |
| Other inc | 899,204 | 1,199,367 | 1,119,821 | 1,230,830 |
| Total inc | $14,575,631 | $13,521,553 | $21,194,660 | $20,262,144 |
| Federal tax | 755,007 | 470,057 | 1,145,746 | 659,431 |
| Interest | 18,075 | 18,151 | 19,083 | 20,816 |
| Net inc | $13,802,549 | $13,033,345 | $20,029,831 | $19,581,897 |
| Deb divs | 1,596,495 | 1,493,028 | 1,489,138 | 1,372,863 |
| Com divs | 10,995,366 | 10,909,285 | 13,315,842 | 14,638,680 |
| Surplus | $1,210,688 | $631,032 | $5,224,851 | $3,570,354 |

## Penn Salt's Year Net $514,129

Pennsylvania Salt reports a net income of $514,129, after depreciation, depletion, development and research reserve and Federal taxes for the fiscal year ended June 30. This was equal to $3.43 per share on the capital stock and it compared with a net of $1,195,998, or $7.97 per capital share, for the previous fiscal year.

The consolidated income account showed total income of $1,819,081 for the fiscal year against $2,688,060 for the previous twelve months. After dividends and all other charges there was a deficit of $105,691 for the year against a surplus of $280,528 in the previous fiscal period. The profit and loss surplus as of June 30 was $6,522,988 against $6,628,679 at the end of the 1929 fiscal year.

The comparative balance sheet as of June 30, showed current assets of $4,136,923, of which cash amounted to $1,034,779 agains $4,341,335 and $1,520,367 respectively in the preceding year. Current liabilities were $855,073 against $911,339. Total assets amounted to $15,163,147 against $15,349,865.

Union Carbide & Carbon and subsidiaries report for quarter ended September 30, 1931, net profit of $4,773,085 after interest, federal taxes, depreciation and preferred dividends of subsidiaries, equivalent to 53 cents a share on 9,000,743 no-par shares of stock. This compares with $4,506,155 or 50 cents a share in preceding quarter and $7,208,679 or 80 cents a share in third quarter of previous year.

Net profit for nine months ended September 30, was $13,892,910 after charges, taxes, etc., equal to $1.54 a share, comparing with $19,988,264 or $2.22 a share in first nine months of 1930.

Consolidated income account for quarter ended September 30, 1931, compares as follows:

| | 1931 | 1930 | 1929 | 1928 |
|---|---|---|---|---|
| Net af fed tax | $6,927,477 | $9,508,731 | $11,965,911 | $10,077,866 |
| Int & sub pfd divs | 311,863 | 336,999 | 307,143 | 312,310 |
| Depr, int | 1,842,529 | 1,963,053 | 2,136,347 | 2,008,815 |
| Net profit | $4,773,085 | $7,208,679 | $9,522,421 | $7,756,741 |

Nine months ended September 30:

| | 1931 | 1930 | 1929 | 1928 |
|---|---|---|---|---|
| Net af fed tax | $20,311,640 | $26,865,969 | $31,379,874 | $26,617,549 |
| Int & sub pfd divs | 940,346 | 967,438 | 924,347 | 903,226 |
| Depr, etc | 5,478,384 | 5,910,267 | 6,404,863 | 6,084,840 |
| Net profit | $13,892,910 | $19,988,264 | $24,050,664 | $19,629,483 |

American Smelting & Refining and subsidiaries for six months ended June 30, 1931, shows net income of $1,265,173 after taxes, interest, depreciation depletion, a metal write down of $1,487,230 and other charges. This is equivalent to $2.53 a share (par $100) on 500,000 shares of 7% first preferred stock and compares with net income of $6,879,442, equal after preferred dividend requirements, to $2.74 a share on 1,829,940 no par shares of common stock to be outstanding when all $100 par stock has been exchanged for no par shares.

## Earnings at a Glance

| Company | Annual Dividends | Net Income 1931 | Net Income 1930 | Common Share Earnings 1931 | Common Share Earnings 1930 |
|---|---|---|---|---|---|
| Abbott Laboratories: | | | | | |
| 8 mos., Aug. 31 | $2.50 | $282,074 | *....... | $1.94 | *.... |
| Amer. Zinc, Lead & Smelting: Sept. 30 | | | | | |
| 30 quarter | f... | $68,980 | $29,114 | p$.86 | p$.36 |
| 9 mos., Sept. 30 | f... | 325,014 | 282,293 | p4.05 | p3.51 |
| Butte Copper & Zinc: | | | | | |
| Sept. 30 quarter | f... | †15,134 | †14,729 | .... | .... |
| 9 mos., Sept. 30 | f... | †31,003 | 3,513 | .... | .... |
| Certain-Teed Products: Sept. 30 qtr. | f... | 4,222 | †419,228 | p.06 | .... |
| 9 mos., Sept. 30 | f... | †196,402 | †1,176,167 | .... | .... |
| Com'l Solvents Corp: | | | | | |
| Sept. 30 quarter | $1.00 | $598,258 | $634,772 | h$.23 | h$.25 |
| 9 mos., Sept. 30 | 1.00 | 1,780,601 | 2,132,289 | h.70 | h.84 |
| Corn Prod. Refining: | | | | | |
| Sept. 30 quarter | §3.00 | 2,059,452 | 3,529,081 | .64 | 1.22 |
| 9 mos., Sept. 30 | §3.00 | 7,553,719 | 10,170,342 | 2.46 | 3.50 |
| DuPont de Nemours: | | | | | |
| Sept. 30 quarter | 4.00 | 13,802,549 | 13,033,345 | j1.11 | j1.05 |
| 9 mos., Sept. 30 | 4.00 | 41,412,943 | 45,984,659 | j3.34 | j3.88 |
| Kellogg (Spencer) & Sons: | | | | | |
| Year, Aug. 29 | .80 | 643,518 | bb636,614 | 1.17 | 1.16 |
| Monsanto Chemical Works: | | | | | |
| Sept. 30 quarter | 1.25 | 361,720 | 173,515 | .84 | .41 |
| 9 mos., Sept. 30 | 1.25 | 1,033,174 | 795,912 | 2.40 | 1.91 |
| Nat'l Distils. Prod.: | | | | | |
| Sept. 30 quarter | 2.00 | †4,621 | ‡100,733 | .... | .... |
| 9 months | 2.00 | ‡376,516 | ‡344,654 | .... | .... |
| Penick & Ford: | | | | | |
| Sept. 30 quarter | §1.00 | ‡208,491 | ‡403,204 | .... | .... |
| 9 mos., Sept. 30 | §1.00 | ‡840,355 | ‡1,404,237 | .... | .... |
| Sherwin-Williams: | | | | | |
| Year, Aug. 31 | 4.00 | 3,322,723 | 3,551,294 | 3.62 | 4.14 |
| Texas Gulf Sulphur: | | | | | |
| Sept. 30 quarter | 3.00 | 2,315,926 | 3,341,753 | .91 | 1.31 |
| 9 mos., Sept. 30 | 3.00 | 6,704,091 | 10,793,799 | 2.64 | 4.25 |
| Union Carbide & Carbon: | | | | | |
| Sept. 30 quarter | 2.60 | 4,773,085 | 7,208,679 | .53 | .80 |
| 9 mos., Sept. 30 | 2.60 | 13,892,910 | 19,983,264 | 1.54 | 2.22 |
| Westvaco Chlorine Products: | | | | | |
| Sept. 30 quarter | 2.00 | 134,321 | 126,911 | h.33 | h.39 |
| 9 mos., Sept. 30 | 2.00 | 511,004 | 577,665 | h1.39 | h2.05 |

*Not available. †Net loss. ‡Profit before federal taxes. §Plus extras. fNo common dividend. hOn outstanding shares at close of respective periods. jOn average shares. pOn preferred stock.

## Westvaco Reports Net $134,321

Westvaco Chlorine Products Corporation and subsidiaries report for three months ended September 26: Net profit, after interest, depreciation, Federal taxes, etc., $134,321, equivalent, after preferred dividend requirements, to 33 cents a share on 284,962 no-par common shares, comparing with $153,243, or 51 cents a share, on 225,155 shares of common in preceding quarter and $126,911, or 39 cents a share, on 225,155 shares in third quarter of 1930. Nine months ended September 26: Net profit, $511,004, equal to $1.39 a share, against $577,665, or $2.05 a share last year; current assets on September 26, $1,556,013; current liabilities, including Federal tax reserve, $216,246.

| *Quarter Ended* | *Sept. 26 '31* | *Sept. 25 '30* |
|---|---|---|
| Sales | $998,094 | $1,229,673 |
| Gross profit | 356,435 | 375,397 |
| Expenses | 81,209 | 96,867 |
| Operating profit | $275,226 | $278,530 |
| Other income | 54,281 | 12,062 |
| Total income | $329,507 | $290,592 |
| Depreciation | 106,368 | 104,000 |
| Federal tax | 16,801 | 15,694 |
| Other deductions | 72,017 | 43,987 |
| Net profits | $134,321 | $126,911 |
| Shs. com. stk. outstand. (no par) | 284,962 | 225,155 |
| Earns. per share | $0.33 | $0.39 |

Net profit for 9 months ended Sept. 26, 1931 was $511,004 after interest, depreciation, Federal taxes, etc., equal after preferred dividend requirements, to $1.39 a share on 284,962 common shares. This compares with $577,665 or $2.05 a share on 225,155 common shares in first nine months of 1930.

## Kellogg Showing Favorable

Spencer Kellogg and subsidiary companies report for year ended August 29, 1931, net profit of $643,518 after depreciation, interest and federal taxes, equivalent to $1.17 a share on 550,000 no-par shares of capital stock. In preceding year company reported for 11 months ended August 30, 1930, and showed net profit of $636,614, equal to $1.16 a share.

Balance sheet as of August 29, 1931, shows current assets of $9,325,458 and current liabilities of $752,982 comparing with $14,259,208 and $5,593,633, respectively, on August 30, 1930.

Consolidated income account for year ended August 29, 1931, compares as follows:

| | *Year ended Aug. 29, '31* | *11 mos. ended Aug. 30, '30* |
|---|---|---|
| *Net sales | $30,462,555 | $43,260,309 |
| Cost of sales and services | 26,673,534 | 38,973,517 |
| Gross profit | $3,789,021 | $4,286,792 |
| Expenses, etc | 2,727,569 | 3,136,359 |
| Depreciation | 529,476 | 542,517 |
| Profit from operation | $531,976 | $607,916 |
| Other income | 161,542 | 632,314 |
| Total income | $693,518 | $1,240,230 |
| Loss of invest written off | ...... | 297,118 |
| Loss on sales of cap assets, etc. | ...... | 232,376 |
| Federal taxes | 50,000 | 74,122 |
| Net profit | $643,518 | $636,614 |
| Dividends | 440,000 | 660,000 |
| Surplus | $203,518 | †$23,386 |

*Including gross income of domestic subsidiaries. †Deficit.

## Abbott Labs. Earns $1.94 a Share

Abbott Laboratories, exclusive of the Canadian subsidiary, report for eight months ended August 31, 1931, net income of $282,074 after charges and taxes, equivalent to $1.94 a share on 145,000 no-par shares of capital stock.

While no comparison of earnings of Abbott Laboratories and Swan-Myers Co. in corresponding period of 1930 is available, A. S. Burdick, president, in a letter to stockholders states that, including profit of the Canadian subsidiary, profit for the first eight months of this year is approximately equal to the combined earnings of Abbott Laboratories and Swan-Myers Co. in the first eight months of 1930.

## Atlas Powder Earnings Decline

Atlas Powder reports for nine months ended September 30, 1931, net income of $650,630 after federal taxes, etc., equivalent after dividend requirements on 6% preferred stock, to 79 cents a share on 261,438 no-par shares of common stock. This compares with $1,075,000 or $2.56 a share in first nine months of 1930.

For quarter ended September 30, 1931, net income was $241,510 after taxes, etc., equal to 36 cents a share on common, comparing with $251,829 or 39 cents a common share in preceding quarter and $350,076 or 82 cents a common share in third quarter of previous year.

Balance sheet of Atlas Powder Co. as of September 30, 1931, shows total assets of $33,469,624 compared with $33,921,753 on September 30, 1930, and profit and loss surplus $7,778,013 against $8,590,024. Total current assets were $11,070,688 and current liabilities $665,053. Cash, collateral loans, U. S. government and marketable securities amounted to $6,201,608. Included in marketable securities are preferred and common stocks of Atlas Powder amounting to $691,992 and unpaid employes' stock subscriptions aggregating $423,188. On September 30, 1930, current assets were $13,558,269 and current liabilities $897,119.

Consolidated income account of Atlas Powder Co. for nine months ended September 30, 1931, compares as follows:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| Net sales | $9,589,387 | $12,867,877 | $17,212,357 | $15,492,346 |
| Net income | 650,630 | 1,075,099 | 2,049,056 | 1,604,339 |
| Pref. divs | 443,833 | 405,000 | 405,000 | 405,000 |
| Surplus | $206,797 | $670,099 | $1,644,056 | $1,199,339 |

## Corn Products' 9 Months Net Off

Corn Products Refining reports for nine months ended September 30, 1931, net income of $7,553,719 after charges, depreciation and federal taxes, equivalent after dividend requirements on 7% preferred stock, to $2.46 a share (par $25) on 2,530,000 shares of common stock. This compares with $10,170,342, or $3.50 a common share in first nine months of 1930.

Net income for quarter ended September 30, 1931, was $2,059,452 after charges and taxes, equal to 64 cents a common share, comparing with $3,104,888, or $1.05 a common share in preceding quarter and $3,529,081, or $1.22 a common share in third quarter of previous year.

Income account for nine months ended September 30, 1931, compares as follows:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| *Net earnings | $6,613,213 | $10,130,477 | $10,814,470 | $8,963,838 |
| Other income | 3,032,069 | 2,369,450 | 2,418,709 | 2,229,563 |
| Total inc | $9,645,282 | $12,499,927 | $13,233,179 | $11,193,401 |
| Int depr etc | 2,091,563 | 2,329,585 | 2,363,997 | 2,287,013 |
| Net income | $7,553,719 | $10,170,342 | $10,869,182 | $8,906,388 |
| Pfd divs | 1,312,500 | 1,312,500 | 1,312,500 | 1,312,500 |
| Com divs | 6,957,500 | 6,957,500 | 6,325,000 | 5,060,000 |
| Deficit | $716,281 | †$1,900,342 | †$3,231,682 | †$2,533,888 |

*After expenses, estimated federal taxes, etc. †Surplus.

Dome Mines, Ltd., reports for nine months ended September 30, 1931; profit of $1,306,589 after expense and federal taxes, but before depreciation and depletion, comparing with loss of $3,515 in first nine months of previous year.

For quarter ended September 30, 1931, profit was $424,098 before depreciation and depletion comparing with profit of $434,343 in preceding quarter and loss of $52,438 in third quarter of 1930.

Income account for nine months ended September 30 1931, compares as follows:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| Gross | $2,654,868 | $377,875 | $3,114,454 | $2,804,001 |
| Expenses | 1,430,015 | 635,420 | 1,600,970 | 1,575,888 |
| Fed tax, etc | 108,626 | ........ | 80,137 | 62,644 |
| Oper profit | $1,116,227 | †$257,545 | $1,433,347 | $1,165,469 |
| Other inc | 190,362 | 254,030 | 240,302 | 169,059 |
| *Profit | $1,306,589 | †$3,515 | $1,673,649 | $1,334,528 |

## Solvents Earns 23c a Share

Commercial Solvents reports for quarter ended September 30, 1931, net profit of $598,258 after depreciation, federal taxes, and provision for contingencies and inventory adjustments, equivalent to 23 cents a share on 2,530,060 shares of no-par common stock. This compares with $644,799 or 25 cents a share on 2,529,996 shares in preceding quarter and $634,772 or 25 cents a share on 2,528,999 shares in third quarter of 1930.

Net profit for nine months ended September 30, 1931, was $1,780,601 after above charges, equal to 70 cents a share on 2,530,060 shares, comparing with $2,132,289 or 84 cents a share on 2,528,999 shares in first nine months of previous year.

Income account for quarter ended September 30, 1931, compares as follows:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| Oper profit | $583,342 | $661,556 | $1,208,238 | $1,119,287 |
| Other income | 76,965 | 40,976 | 115,552 | 37,664 |
| Total inc | $660,307 | $702,532 | $1,323,790 | $1,156,951 |
| Other deduct | 6,048 | 23,409 | 115,456 | 99,113 |
| *Fed tax etc | 56,001 | 44,351 | 196,596 | 159,304 |
| Net profit | $598,258 | $634,772 | $1,011,738 | $898,534 |

Nine months ended September 30:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| Oper profit | $2,043,177 | $2,517,927 | $3,529,118 | $2,627,996 |
| Other income | 125,754 | 167,024 | 279,103 | 80,895 |
| Total inc | $2,168,931 | $2,684,951 | $3,808,221 | $2,708,891 |
| Other deduct | 54,603 | 77,678 | 361,486 | 219,951 |
| *Fed tax, etc | 333,727 | 474,984 | 637,073 | 389,166 |
| Net profit | $1,780,601 | $2,132,289 | $2,809,662 | $2,099,774 |

*Includes provision for contingencies and inventory adjustments.

## Hercules Reports $351,783 for Quarter

Hercules Powder reports for nine months ended September 30, 1931, net profit of $1,087,886 after depreciation, taxes, etc., equivalent after dividend requirements on 7% preferred stock, to 81 cents a share on 606,234 no-par shares of common stock. This compares with $2,160,260 or $2.59 a share on 603,079 common shares in first nine months of previous year.

Net profit for quarter ended September 30, 1931, was $351,783 after charges and taxes, equal to 26 cents a share on 606,234 common shares comparing with $519,644 or 52 cents a share on 606,234 common shares in preceding quarter and $561,792 or 60 cents a share on 603,079 shares in third quarter of previous year.

| *9 Mos. End. Sept. 30—* | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| Gross receipts | $15,523,274 | $20,416,664 | $25,612,546 | $22,321,887 |
| Net earns. fr. all sourcesx | 1,218,958 | 2,444,275 | 3,738,657 | 3,288,904 |
| Fed. income tax (est.) | 131,071 | 284,015 | 502,466 | 468,828 |
| Net profit for period | $1,087,886 | $2,160,260 | $3,236,190 | $2,820,112 |
| Proceeds fr. sale of cap. stock in excess of stated value | 110,425 | 177,765 | 350,000 | ——— |
| Surplus at begin. of year | 13,329,725 | 13,380,596 | 12,863,378 | 11,682,085 |
| Total | $14,528,036 | $15,718,621 | $16,449,569 | $14,502,197 |
| Divs. on pref. stock | 599,765 | 599,765 | 599,765 | 599,765 |
| Divs. on common stock | 1,361,660 | 1,353,118 | 1,345,500 | 882,000 |
| Surplus at Sept. 30 | $12,566,611 | $13,765,737 | $14,504,304 | $13,020,432 |
| Shs. com. stk. out. (no par) | 606,234 | 603,079 | 598,000 | y147,000 |
| Earnings per share | $0.81 | $2.59 | $4.41 | $15.10 |

xAfter deducting all expenses incident to manufacture and sale, ordinary and extraordinary repairs, maintenance of plants, accidents, depreciation, etc. yPar $100 per share.

## Monsanto Makes Favorable Showing

Monsanto Chemical Works and subsidiaries report for quarter ended September 30, 1931, consolidated net profit of $361,720 after charges and federal taxes, equivalent to 84 cents a share on 429,000 no-par shares of stock. This compares with $416,076 or 97 cents a share on 429,000 shares in preceding quarter and $173,515 or 41 cents a share on 416,449 shares in third quarter of 1930.

Consolidated net profit for nine months ended September 30, 1931, was $1,033,174 after charges and taxes, equal to $2.40 a share on 429,000 shares, comparing with $795,912 or $1.91 a share on 416,449 shares in first nine months of previous year.

## Mathieson's 3rd Quarter Better

Mathieson Alkali Works reports for quarter ended September 30, 1931, net income of $387,256 after depreciation, depletion, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock, to 53 cents a share on 650,380 no-par shares of common stock. This compares with $378,146 or 51 cents a common share in preceding quarter and $489,828 or 69 cents a common share in third quarter of previous year.

Net income for nine months ended September 30, 1931 was $1,062,806 after charges and taxes equal to $1.43 a share on common comparing with $1,597,462 or $2.26 a common share in first nine months of 1930.

Income account for quarter ended September 30, 1931 compares as follows:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| Oper profit | $711,119 | $850,326 | $951,984 | $884,213 |
| Dep and depl | 287,872 | 310,612 | 257,728 | 228,866 |
| Profit | $423,247 | $539,714 | $694,256 | $655,347 |
| Oth inc (net) | 10,267 | 8,136 | 8,361 | *5,333 |
| Total inc | $433,514 | $547,850 | $702,617 | $650,014 |
| Fed taxes | 46,258 | 58,022 | 93,085 | 76,123 |
| Net inc | $387,256 | $489,828 | $609,532 | $573,891 |

Nine months ended September 30:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| Oper profit | $2,005,428 | $2,638,787 | $2,724,666 | $2,480,125 |
| Dep and depl | 857,617 | 893,541 | 772,408 | 682,832 |
| Profit | $1,147,811 | $1,745,246 | $1,952,258 | $1,797,293 |
| Oth inc (net) | 32,152 | 43,951 | 25,182 | *28,297 |
| Total inc | $1,179,963 | $1,789,197 | $1,977,440 | $1,768,996 |
| Fed taxes | 117,157 | 191,735 | 250,536 | 208,976 |
| Net inc | $1,062,806 | $1,597,462 | $1,726,904 | $1,560,020 |

*Debit.

United States Smelting, Refining & Mining Co. reports for eight months ended August 31, 1931, consolidated net profit of $1,241,982 after interest, depreciation, depletion, amortization, etc., equivalent after dividend requirements on 7% preferred stock, to 19 cents a share (par $50) on 554,962 common shares. This compares with $2,282,105 or $1.85 a share on 620,562 common shares in corresponding period of previous fiscal year.

Consolidated income account for eight months ended August 31, 1931, compares as follows:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| Profit after interest | $2,667,532 | $4,123,443 | $4,419,964 | $3,939,012 |
| Depr., depl., amort. | 1,425,550 | 1,841,338 | 1,373,455 | 1,569,334 |
| Net profit | $1,241,982 | $2,282,105 | $3,046,509 | $2,369,678 |
| Pfd divs | 1,134,817 | 1,134,817 | 1,134,817 | 1,134,817 |
| Surplus | $107,165 | $1,147,288 | $1,911,692 | $1,234,861 |

Texas Gulf Sulphur reports for quarter ended September 30, 1931, net income of $2,315,926 after depreciation and federal taxes, but before depletion, equivalent to 91 cents a share on 2,540,000 shares of no-par stock. This compares with $1,939,967 or 76 cents a share in preceding quarter and $3,341,753 or $1.31 a share in third quarter of previous year.

Net income for nine months ended September 30, totaled $6,704,091 before depletion, equal to $2.64 a share, against $10,793,799 or $4.25 a share in first nine months of 1930.

During the last quarter the company increased its reserves for depreciation and accrued federal taxes by $74,676, making total of these reserves $13,791,392 on September 30, 1931.

Statement for quarter ended September 30, 1931, compares as follows:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| *Net income | $2,315,926 | $3,341,753 | $4,028,959 | $3,680,723 |
| Dividends | 1,905,000 | 2,540,000 | 2,540,000 | 2,540,000 |
| Surplus | $410,926 | $801,753 | $1,488,959 | $1,140,723 |

Nine months ended September 30:

| | *1931* | *1930* | *1929* | *1928* |
|---|---|---|---|---|
| *Net income | $6,704,091 | $10,793,799 | $11,480,489 | $10,355,381 |
| Dividends | 6,350,000 | 7,620,000 | 7,620,000 | 7,620,000 |
| Surplus | $354,091 | $3,173,799 | $3,860,489 | $2,735,381 |
| †P & L surp | 25,554,736 | 24,562,360 | 19,161,572 | 13,678,845 |

*After depreciation and federal taxes. †Includes reserves for depletion.

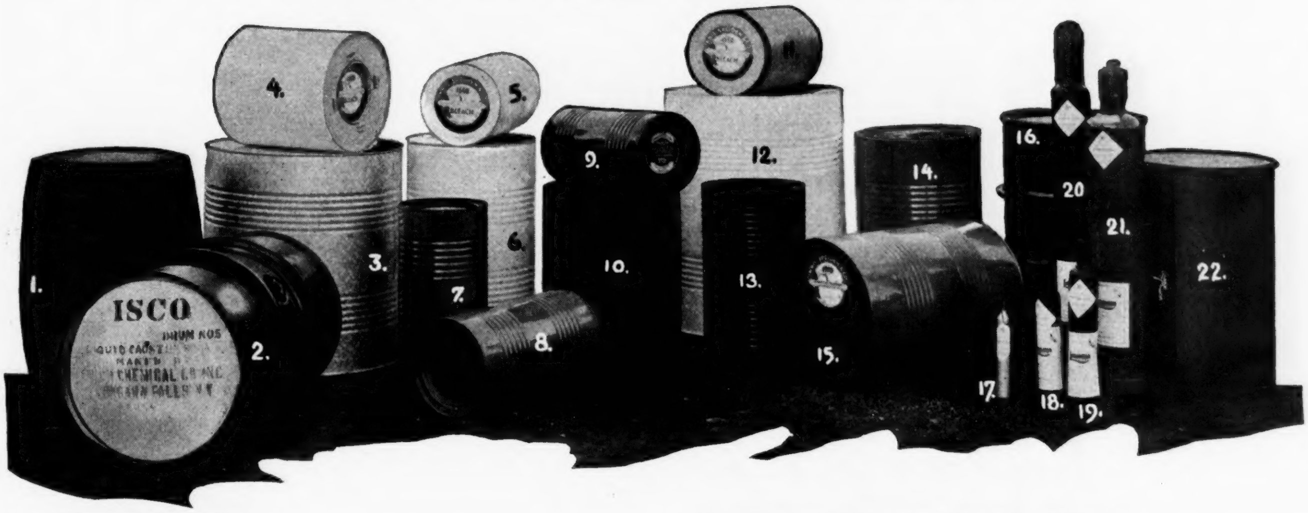
# ISCO CHEMICALS

## Are Scientifically Right

### And Are Put in Containers that **Stand the Gaff!**

### SPECIFY THEM FOR 1932

**Note the improved packages—See the special bungs, friction caps and specially designed lugs, all intended to save your plant operators' time and avoid waste.**




**1. IRON CHLORIDE:**
C. P. Lump, hardwood barrels, approximately 450 pounds net. Available also in a liquid of any strength desired, in carboys, drums and tank cars.

**2. LIQUID CAUSTIC SODA:**
Tank cars or steel drums, 55 gallons, 675 pounds net, or 110 gallons, about 1,300 pounds net, furnished in any desired strength.

**3. CHLORIDE OF LIME (Bleaching Powder):**
A galvanized drum holding about 850 pounds net, a great improvement over the old iron drum for keeping the quality of the contents; also available in a 333 pound net weight drum.

**4. CHLORIDE OF LIME (Bleaching Powder):**
Steel drum painted with a special rust and heat resisting white paint, holding 125 pounds net.

**5. CHLORIDE OF LIME (Bleaching Powder):**
Another modern galvanized drum, 100 pounds net.

**6. CHLORIDE OF LIME (Bleaching Powder):**
A drum having a uniform net weight of 333 pounds each. This is a steel drum treated with heat and rust resisting white paint.

**7. FLAKE CAUSTIC POTASH:**
A convenient drum, 125 pounds net.

**8. FLAKE CAUSTIC SODA:**
A drum handy to use; equipped with removable cap, 125 pounds net.

**9. ISCO SELECTED WALNUT SIZE CAUSTIC POTASH:**
A special drum for a special product, 100 pounds net.

**10. SOLID CAUSTIC POTASH, 88/92%:**
A standard product in drums of approximately 550 pounds net.

**11. CHLORIDE OF LIME (Bleaching Powder):**
A fibre drum 125 pounds net.

**12. CHLORIDE OF LIME (Bleaching Powder):**
A steel drum painted with the special heat and rust resisting white paint, holding about 850 pounds net.

**13. GROUND CAUSTIC POTASH:**
An especially convenient drum holding 225 pounds net, with the removable cap.

**14. FLAKE CAUSTIC SODA:**
Net weight 400 pounds. Note the special removable cap.

**15. FLAKE CAUSTIC POTASH:**
A drum with the special economy cap. 400 pounds net.

**16. LIQUID CAUSTIC POTASH:**
Tank cars and drums of 55 gallons (675 pounds net) and 110 gallons (about 1,300 pounds net).

**17-18-19-**
**20-21. ISCO LARVACIDE:**
In the special steel cylinders holding 1, 3, 5, 25 and 100 pounds net weights, respectively.

**22. SOLID CAUSTIC SODA:**
The standard ISCO product in a steel drum, net weight about 700 pounds.

Chicago
Boston
Gloversville

**INNIS, SPEIDEN & CO.**
INCORPORATED
**117-119 LIBERTY STREET, NEW YORK**

Cleveland
Philadelphia

# The Industry's Stocks

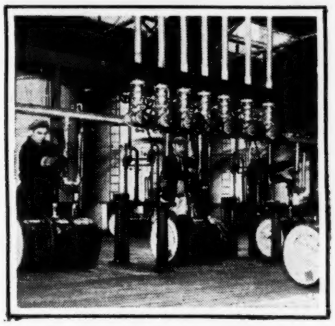
| Last | 1931 Oct. High | 1931 Oct. Low | 1931 High | 1931 Low | 1930 High | 1930 Low | Sales In Oct. | Sales During 1931 | ISSUES | Par $ | Shares Listed | An. Rate | Earnings $-per share-$ 1930 | 1929 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | **NEW YORK STOCK EXCHANGE** | | | | | |
| 65 | 69 | 52 | 109⅜ | 52 | 156⅞ | 87½ | 96,400 | 1,344,100 | Air Reduction | No | 830,000 | $3.00 | 6.32 | 7.75 |
| 85⅝ | 90¼ | 68 | 182¾ | 68 | 343 | 170½ | 440,900 | 2,621,985 | Allied Chem. & Dye | No | 2,401,000 | 6.00 | 9.77 | 12.60 |
| 117 | 121 | 114⅛ | 133¼ | 120½ | 126¼ | 120¾ | 2,600 | 15,900 | 7% cum. pfd. | 100 | 393,000 | 7.00 | | 76.88 |
| 8⅛ | 8½ | 5⅛ | 29¾ | 5⅛ | 10⅞ | 1⅝ | 14,400 | 75,900 | Amer. Agric. Chem. | 100 | 333,000 | | Yr. Je. '30 Nil | |
| 9 | 9⅛ | 5 | 14½ | 5 | 33 | 9 | 47,500 | 249,000 | Amer. Com. Alc. | No | 389,000 | | d1.27 | 3.22 |
| 7½ | 8½ | 6⅝ | 23¾ | 6⅝ | 51⅛ | 7 | 27,000 | 158,000 | Amer. Metal Co., Ltd. | No | 1,218,000 | 1.00 | 1.63 | 3.23 |
| 30⅛ | 36 | 30 | 89½ | 30 | 116 | 80 | 320 | 1,720 | conv. 6% cum. pfd. | 100 | 68,000 | 6.00 | | 47.53 |
| 24⅞ | 28⅜ | 20 | 58½ | 19¾ | 79⅛ | 37½ | 104,900 | 968,645 | Amer. Smelt. & Refin. | No | 1,830,000 | 4.00 | 3.77 | 10.02 |
| 101 | 103 | 98½ | 138½ | 98½ | 141 | 131 | 3,100 | 18,600 | 7% cum. pfd. | 100 | 500,000 | 7.00 | | 43.66 |
| ⅞ | ⅞ | ½ | 4½ | ½ | 22½ | 2 | 16,000 | 132,300 | Amer. Solvents & Chem. | No | 503,000 | | d2.86 | 2.56 |
| 4 | 5 | 2¾ | 8¾ | 2¾ | 17⅞ | 3⅜ | 5,700 | 40,900 | Amer. Zinc. Lead, & Smelt. | 25 | 200,000 | | d1.46 | 0.53 |
| ... | 29 | 23 | 45⅛ | 26¾ | 79⅞ | 26¾ | 2,400 | 15,900 | 6% cum. pfd. | 25 | 80,000 | | | 7.32 |
| 15⅞ | 18⅝ | 12⅝ | 43¼ | 12⅝ | 81½ | 25 | 377,000 | 4,998,903 | Anaconda Copper Mining | 50 | 8,859,000 | 2.50 | e2.07 | 8.29 |
| 12¼ | 13 | 8 | 18 | 8 | 29¼ | 13⅛ | 9,000 | 105,700 | Archer Dan. Midland | No | 550,000 | 2.00 | Yr. Aug. 30 1.68 | |
| 13⅜ | 13⅜ | 9½ | 23⅝ | 9½ | 51⅞ | 16⅞ | 70,800 | 818,375 | Atlantic Refining Co. | 25 | 2,690,000 | 1.00 | 1.02 | 6.20 |
| 21 | 24½ | 20⅜ | 54 | 20⅜ | 106 | 42 | 9,200 | 42,700 | Atlas Powder Co. | No | 265,000 | 4.00 | 2.67 | 7.66 |
| ... | 83 | 78 | 99⅞ | 82½ | 106 | 97 | 720 | 4,360 | 6% cum. pfd. | 100 | 96,000 | 6.00 | | 28.25 |
| ⅞ | ⅞ | ¾ | 2 | ¾ | 5⅛ | ⅞ | 3,200 | 25,400 | Butte & Sup. Mining | 10 | 290,000 | | | Nil |
| 1¾ | 1¾ | 1¼ | 2¾ | 1⅛ | 4⅛ | 1½ | 6,100 | 40,400 | Butte Copper & Zinc | 5 | 600,000 | | Nil | 0.34 |
| 3⅜ | 3⅝ | 3 | 7¼ | 2¼ | 15⅞ | 2 | 4,300 | 80,000 | Certain-Teed Products | No | 400,000 | | d7.61 | Nil |
| 22½ | 22½ | 22½ | 25⅛ | 8¼ | 45⅛ | 6¾ | 300 | 4,710 | 7% cum. pfd. | 100 | 63,000 | | | Nil |
| 32⅞ | 34¼ | 28⅝ | 50½ | 28 | 64⅞ | 44 | 16,400 | 121,000 | Colgate-Palmolive-Peet | No | 2,000,000 | 2.50 | 3.76 | 4.03 |
| 47 | 51½ | 33 | 111⅝ | 33 | 199 | 65⅛ | 77,200 | 704,720 | Columbian Carbon | No | 499,000 | 5.00 | 5.04 | 7.84 |
| 11½ | 12⅞ | 9⅛ | 21½ | 9⅛ | 38 | 14 | 243,600 | 2,482,790 | Comm. Solvents | No | 2,530,000 | 1.00 | 1.07 | 1.51 |
| 47⅛ | 47¾ | 36¼ | 86⅝ | 36¼ | 111⅜ | 65 | 78,950 | 765,450 | Corn Products | 25 | 2,530,000 | 3.00 | 4.82 | 5.49 |
| 130¼ | 140 | 126 | 152¼ | 140 | 151½ | 140 | 1,660 | 8,530 | 7% cum. pfd. | 100 | 250,000 | 7.00 | | 62.59 |
| 6 | 6⅞ | 4 | 23 | 4 | 43⅞ | 10 | 24,100 | 324,900 | Davison Chem. Co. | No | 504,000 | | Yr. Je. '30 4.00 | |
| 12¾ | 12¾ | 11 | 19⅛ | 11 | 42¾ | 11½ | 1,500 | 24,200 | Devoe & Raynolds "A" | No | 160,000 | 1.20 | 2.24 | 4.52 |
| 101 | 101 | 101 | 109 | 100 | 114¾ | 99 | 20 | 700 | 7% cum. 1st pfd. | 100 | 16,000 | 7.00 | | 67.59 |
| 59 | 64 | 53¾ | 107 | 53¾ | 145¼ | 80½ | 734,800 | 4,481,800 | DuPont de Nemours | 20 | 11,014,000 | 4.00 | 4.52 | 6.99 |
| 107½ | 120 | 106 | 124¾ | 116⅛ | 123 | 114½ | 12,600 | 41,020 | 6% cum. deb. | 100 | 978,000 | 6.00 | | 78.54 |
| 109 | 116½ | 93 | 185¾ | 93 | 255¼ | 142⅜ | 174,500 | 1,492,869 | Eastman Kodak | No | 2,261,000 | 5.00 | 8.84 | 9.57 |
| 123¼ | 135 | 121 | 135 | 126 | 134 | 120⅞ | 1,050 | 2,630 | 6% cum. pfd. | 100 | 62,000 | 6.00 | | 356.89 |
| 21 | 22½ | 13¼ | 43⅛ | 13¼ | 55½ | 24½ | 147,000 | 907,300 | Freeport Texas Co. | No | 730,000 | 4.00 | w4.77 | 5.60 |
| 15⅞ | 16⅞ | 9¾ | 47 | 9⅝ | 71⅛ | 22⅜ | 67,200 | 650,200 | General Asphalt Co. | No | 413,000 | 3.00 | 2.44 | 4.71 |
| 8 | 8 | 4½ | 16⅛ | 4½ | 38 | 7 | 26,100 | 217,271 | Glidden Co. | No | 695,000 | | Yr. Oct. '30 Nil | |
| 59⅝ | 73¼ | 53¾ | 80 | 60 | 105⅛ | 63½ | 570 | 8,250 | 7% cum. prior pref. | 100 | 74,000 | 7.00 | Yr. Oct. '30 Nil | |
| 33 | 37⅝ | 33 | 58 | 33 | 85 | 50 | 3,400 | 14,900 | Hercules Powder Co. | No | 603,000 | 3.00 | 2.61 | 5.95 |
| 103 | 111½ | 103 | 119½ | 111½ | 123¾ | 116⅛ | 1,730 | 5,680 | 7% cum. pfd. | 100 | 114,000 | 7.00 | | 38.16 |
| 33½ | 36¼ | 21 | 86 | 21 | 124 | 31 | 33,600 | 375,600 | Industrial Rayon | No | 200,000 | 4.00 | 7.74 | 7.26 |
| 1½ | 1½ | 1⅛ | 5¼ | 1⅛ | 8½ | 3⅜ | 3,500 | 41,300 | Intern. Agric. | No | 450,000 | | Yr. Je.'30 1.68 | |
| 10 | 10½ | 7 | 51¼ | 10¼ | 67¼ | 42¼ | 3,400 | 18,200 | 7% cum. prior pfd. | 100 | 100,000 | 7.00 | Yr. Je. '30 14.58 | |
| 9 | 10¼ | 7⅜ | 20⅛ | 7⅝ | 44⅞ | 12¾ | 658,424 | 5,821,724 | Intern. Nickel | No | 14,584,000 | 1.00 | .67 | 1.47 |
| 36 | 36 | 25¼ | 42 | 25¼ | 45¾ | 31 | 23,400 | 390,000 | Intern. Salt | No | 240,000 | 3.00 | | 11.32 |
| 32 | 41⅜ | 29½ | 80¾ | 29½ | 148⅞ | 48¾ | 147,975 | 2,720,475 | Johns-Manville Corp. | No | 750,000 | 3.00 | 3.66 | 8.09 |
| 12 | 13 | 9 | 16½ | 9 | 25 | 8¾ | 2,000 | 14,800 | Kellogg (Spencer) | No | 598,000 | 0.80 | h1.14 | 2.36 |
| 18½ | 20 | 15¼ | 55⅛ | 15¼ | 81⅞ | 39 | 14,600 | 234,500 | Liquid Carbonic Corp. | No | 342,000 | 4.00 | Yr. Sep. '30 5.22 | |
| 7¾ | 8½ | 7 | 17 | 7 | 37⅜ | 10½ | 18,000 | 323,100 | McKesson & Robbins | No | 1,073,000 | 1.00 | .96 | 2.65 |
| 22⅞ | 23¼ | 19 | 37⅜ | 20 | 49¼ | 25¾ | 5,627 | 43,827 | conv. 7% cum. pref. | 50 | 428,180 | 3.50 | | 9.43 |
| 15 | 15⅞ | 15 | 25 | 15 | 39¾ | 20 | 700 | 13,800 | MacAndrews & Forbes | No | 340,000 | 2.60 | 2.61 | 3.13 |
| 19 | 20⅝ | 14¾ | 31½ | 14¾ | 51⅜ | 30¼ | 20,900 | 414,065 | Mathieson Alkali | No | 650,000 | 2.00 | 2.96 | 3.31 |
| 108 | 112½ | 104 | ... | 104 | 136 | 115 | 150 | 900 | 7% cum. pfd. | 100 | 28,000 | 7.00 | | 93.91 |
| 24½ | 24⅞ | 16¼ | 29 | 16¼ | 63¾ | 18⅜ | 14,900 | 75,900 | Monsanto Chem. | No | 416,000 | 1.25 | 1.71 | 4.25 |
| 22⅞ | 25 | 19¾ | 36⅜ | 19¾ | 39½ | 18⅛ | 22,300 | 340,200 | National Dist. Prod. | No | 252,000 | 2.00 | 1.23 | 1.42 |
| 96 | 97 | 84¼ | 132 | 84¼ | 189½ | 114 | 2,100 | 74,000 | National Lead | 100 | 310,000 | 5.00 | 7.58 | 25.49 |
| 132 | 140 | 130 | 143 | 135⅝ | 144 | 135 | 3,070 | 9,300 | 7% cum. "A" pfd. | 100 | 244,000 | 7.00 | | 41.95 |
| 102½ | 119 | 102½ | 120 | 102½ | 120 | 116 | 2,130 | 6,410 | 6% cum. "B" pfd. | 100 | 103,000 | 6.00 | | 82.47 |
| 55⅛ | 55¼ | 55 | 55¼ | 41 | 85 | 30 | 3,100 | 13,600 | Newport $3 cum. conv. "A" | 50 | 33,000 | 3.00 | z5.94 | 29.79 |
| 26½ | 29 | 22 | 46½ | 22 | 55⅜ | 26⅛ | 18,100 | 321,200 | Penick & Ford | No | 425,000 | 1.00 | 4.01 | 3.97 |
| 46⅜ | 48½ | 39⅝ | 71¼ | 39⅝ | 78⅞ | 52⅜ | 86,000 | 411,000 | Procter & Gamble | No | 6,410,000 | 2.40 | Yr. Je. '30 3.36 | |
| 6¼ | 6½ | 5 | 11⅞ | 5 | 27¼ | 7⅝ | 55,900 | 498,100 | Pure Oil Co. | 25 | 3,038,000 | | .18 | 1.52 |
| 69⅞ | 74¾ | 65 | 101⅞ | 65 | 114¼ | 90⅛ | 1,600 | 10,300 | 8% cum. pfd. | 100 | 130,000 | 8.00 | | 22.55 |
| 17½ | 20⅝ | 16⅜ | 42⅝ | 13½ | 56½ | 36⅞ | 27,200 | 366,800 | Royal Dutch, N. Y. shs. | | 894,000 | | 2.39 | 3.35 |
| 12¼ | 13½ | 9¼ | 30⅜ | 9¼ | 57¼ | 19¼ | 26,400 | 329,540 | St. Joseph Lead | 10 | 1,951,000 | 2.00 | 2.09 | 3.82 |
| 5¼ | 5⅜ | 3¼ | 10¼ | 3¼ | 25⅛ | 5¼ | 69,400 | 852,890 | Shell Union Oil | No | 13,071,000 | | d.56 | 1.26 |
| 34 | 34½ | 28⅛ | 51¾ | 28⅛ | 75 | 42¼ | 160,900 | 1,247,410 | Standard Oil, Calif. | No | 12,846,000 | 2.50 | 2.88 | 3.63 |
| 34½ | 34⅞ | 28¼ | 52½ | 28¼ | 84⅞ | 43⅛ | 397,500 | 3,820,925 | Standard Oil, N. J. | 25 | 25,419,000 | 1.00 | 1.65 | 4.76 |
| 14¾ | 15⅜ | 12⅛ | 26 | 12⅛ | 40⅞ | 19¾ | 237,800 | 2,405,155 | Standard Oil, N. Y.* | 25 | 17,809,000 | 1.60 | .92 | 2.23 |
| 3¼ | 3¼ | 2⅝ | 9½ | 2⅝ | 17 | 7¾ | 7,600 | 80,400 | Tenn. Corporation | No | 857,000 | 1.00 | 1.21 | 2.19 |
| 19½ | 19½ | 15 | 36¼ | 15 | 60⅛ | 28¼ | 164,100 | 1,787,200 | Texas Corp. | 25 | 9,851,000 | 3.00 | 1.53 | 4.91 |
| 28 | 28¼ | 20⅜ | 55¾ | 20⅜ | 67⅞ | 40¼ | 104,350 | 1,658,150 | Texas Gulf Sulphur | No | 2,540,000 | 4.00 | 5.50 | 6.40 |
| 36⅛ | 37⅞ | 27½ | 72 | 27½ | 106⅞ | 52⅛ | 390,300 | 3,852,075 | Union Carbide & Carb. | No | 9,001,000 | 2.60 | 3.12 | 3.94 |
| 14 | 18 | 6⅛ | 28¾ | 6⅛ | 84 | 14⅞ | 36,200 | 480,700 | United Carbon Co. | No | 398,000 | | 1.43 | 1.94 |
| 32⅜ | 33¼ | 20⅜ | 77⅜ | 20⅜ | 139⅜ | 50½ | 157,816 | 973,116 | U. S. Ind. Alc. Co. | No | 374,000 | 6.00 | z2.96 | 12.63 |
| 19¾ | 22¼ | 13¼ | 76¾ | 13¼ | 143¼ | 44⅞ | 179,200 | 7,843,350 | Vanadium Corp. of Amer. | No | 378,000 | 3.00 | 2.95 | 4.91 |
| 1 | 1 | ½ | 3¼ | ½ | 8⅞ | 1⅝ | 7,500 | 30,300 | Virginia Caro. Chem. | No | 487,000 | | Yr. Je. '30 Nil | |
| 4½ | 5 | 4¼ | 17 | 4¼ | 34¼ | 9 | 4,900 | 23,650 | 6% cum. part. pfd. | 100 | 213,000 | | Yr. Je. '30 2.63 | |
| 50 | 50½ | 48½ | 72 | 50 | 82⅞ | 67½ | 4,800 | 13,300 | 7% cum. prior pfd. | 100 | 145,000 | 7.00 | Yr. Je. '30 11.96 | |
| 12⅞ | 14⅜ | 8¼ | 40 | 8¼ | 59½ | 18 | 33,000 | 152,050 | Westvaco Chlorine Prod. | No | | 2.00 | 2.51 | 4.32 |

h 11 mos. ending Aug. 30
w 13 mos.
z Before inventory adjustment
* Socony Vacuum

| Last | 1931 Oct. High | 1931 Oct. Low | 1931 High | 1931 Low | 1930 High | 1930 Low | Sales In Oct. | Sales During 1931 | ISSUES | Par $ | Shares Listed | An. Rate | Earnings $-per share-$ 1930 | 1929 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | **NEW YORK CURB** | | | | | |
| 6½ | 7⅛ | 6⅜ | 8½ | 5 | 13 | 3⅜ | 1,000 | 6,500 | Acetol Prod. conv. "A" | No | 60,000 | | | 0.42 |
| 4 | 4 | 4 | 19½ | 4 | 34 | 16 | 100 | 86,925 | Agfa Ansco Corp. | No | 300,000 | | | Nil |
| 80 | 88¾ | 73¾ | 224 | 73¾ | 356 | 140½ | 40,525 | 218,043 | Aluminum Amer. | No | 1,473,000 | | z1.93 | 11.18 |
| 79 | 85 | 75¼ | 109⅝ | 75¼ | 111½ | 104 | 5,200 | 30,200 | 6% cum. pfd. | 100 | 1,473,000 | 6.00 | | 17.19 |
| 4⅞ | 5⅛ | 3⅝ | 12¾ | 3⅝ | 37 | 6⅜ | 83,072 | 635,172 | Amer. Cyanamid "B' | No | 2,404,000 | | | 4.15 |
| ½ | 1 | ½ | 15 | ½ | 43⅜ | 7½ | 5,300 | 76,700 | Anglo-Chilean Nitrate | No | 1,757,000 | | Yr. Je. '30 Nil | |
| ... | 2½ | ½ | 4 | ½ | 6½ | ½ | 3,500 | 25,206 | Assoc. Rayon Corp. | No | 1,200,000 | | Yr. Je. '30 1.87 | |
| ... | ... | ... | 60 | 32¼ | 60⅜ | 31¼ | | 47,300 | conv. 6% cum. pfd. | 100 | 200,000 | 6.00 | | |

In these large distilling columns many chemical solvents are produced.

An assembly of 20 large storage tanks for important solvent chemicals.



Accurate measure is guaranteed by these automatic - electric filling machines.

# ETHYL OXALATE

## (*Di-ethyl Oxalate*)

$(COOC_2H_5)_2$

### SPECIFICATIONS

***Color & Properties:***
Colorless liquid

***Constants:***
Ester—at least 97%
Sp. gr. 1.077 at 20°/20°C.
Wt. per gal. 8.96 lbs.
Acidity: Not over 0.1% as oxalic acid
Boiling point: 184°—185°C.

***Solubility:***
Miscible in all proportions with alcohol, ether, ethyl acetate, and other common organic solvents. Only very slightly soluble in water

***Derivation:***
Esterification of oxalic acid

***Method of Purification:***
Distillation

***Grades:***
Technical 96-100% di-ethyl oxalate

***Containers:***
Steel or tin-lined drums
Glass bottles

***Fire Hazard:***
Combustible, but not inflammable, flash point above 80°F.

***Railroad Shipping Regulations:***
None

**LEADING manufacturers in the pharmaceutical and dyestuff industries are the largest tonnage purchasers of this important chemical. Ethyl oxalate is also used extensively by research chemists as its structure lends itself readily to organic coupling.**

**The extreme purity and uniformity of ethyl oxalate are guaranteed by a rigidly enforced manufacturing standard supervised by a corps of 24 chemists. Today, the U. S. I. C. Company is the largest producer of ethyl oxalate.**

**Trial samples will be furnished on request while working quantities are supplied to manufacturers and laboratories at nominal cost. U. S. Industrial Chemical Co., Inc., 60 East 42nd Street, New York City, N. Y.**

# U.S. INDUSTRIAL CHEMICAL CO., INC.

**WORLD'S OLDEST AND LARGEST MANUFACTURER OF ALCOHOL CHEMICALS**

*Ethyl Phthalate. Butyl Phthalate. Nitrocellulose Solutions*

*Amyl Acetate. Butyl Acetate. Ethyl Acetate. Ethyl Chloro Carbonate. Ether*

U·S· INDUSTRIAL CHEMICAL ·CO·

• DIVISION OF U. S. INDUSTRIAL ALCOHOL CO. •

| 1931 Oct. Last | 1931 Oct. High | 1931 Oct. Low | 1931 High | 1931 Low | 1930 High | 1930 Low | Sales In Oct. | Sales During 1931 | ISSUES | Par $ | Shares Listed | An. Rate | Earnings $-per share-$ 1930 | 1929 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1½ | 1½ | ⅜ | 1½ | ⅞ | 5¼ | 1⅛ | 1,000 | 23,900 | Brit. Celanese Am. Rcts......... | 2.43 | 2,806,000 | | | 0.03 |
| ... | ... | ... | 81¼ | 64¾ | 90 | 48 | | 2,750 | 7% cum. part. 1st pfd....... | 100 | 148,000 | 7.00 | | 14.50 |
| ... | 63 | 61⅝ | 65 | 45½ | 90 | 70 | 775 | 5,360 | 7% cum. prior pfd.......... | 100 | 115,000 | 7.00 | | 25.70 |
| ... | ... | ... | ... | ... | 20 | 3½ | | 6,440 | Celluloid Corp.............. | No | 195,000 | | | 1.76 |
| ... | 6⅞ | 6 | 9 | 6⅞ | 13½ | 8⅝ | 1,700 | 8,140 | Courtaulds, Ltd............ | 1£ | | | | 0.34 |
| ... | 40 | 34½ | 51 | 34 | 100 | 49 | 600 | 5,500 | Dow Chemical............... | No | 630,000 | 2.00 | 3.44 | 4.08 |
| 49½ | 50 | 38 | 75½ | 38 | 166⅞ | 58½ | 47,800 | 297,900 | Gulf Oil.................... | 25 | 4,525,000 | 1.50 | | 9.83 |
| 7¾ | 9 | 7¾ | 13 | 8 | 23 | 10½ | 1,700 | 4,600 | Heyden Chemical Corp.......... | 10 | 150,000 | | | 3.08 |
| 3 | 3 | 2½ | 3½ | 3 | 7 | 4 | 1,400 | 3,700 | Imperial Chem. Ind............ | 1£ | | | | 0.49 |
| ... | ... | ... | ... | ... | 16 | 3½ | | 100 | Monroe Chem................ | No | 126,000 | | | 2.54 |
| ... | 30⅜ | 20 | 60 | 20 | 79½ | 45 | 5,400 | 12,300 | Shawinigan W. & P............ | No | 2,178,000 | 2.50 | | 2.35 |
| 45½ | 48 | 45½ | 66½ | ... | 85 | 58 | 100 | 7,700 | Sherwin-Williams Co............ | 25 | 636,000 | 4.00 | Yr. Aug. '30 4.14 | |
| 2½ | 2½ | 2 | 12 | 2 | 34½ | 3⅝ | 3,300 | 42,800 | Silica Gel Corp............... | No | 600,000 | | | |
| 20¾ | 21½ | 15⅞ | 38½ | 15⅞ | 59⅞ | 30 | 172,300 | 532,600 | Standard Oil Ind............... | 25 | 16,851,000 | 2.50 | 2.73 | 4.66 |
| 22½ | 23½ | 20¾ | 30⅝ | 20¾ | 34½ | 27 | 18,300 | 87,700 | Swift & Co..................... | 25 | 6,000,000 | 2.00 | 2.08 | 2.18 |
| 3½ | 4½ | 2⅜ | 16 | 2⅜ | 22¾ | 3 | 10,200 | 160,750 | Tubize "B"..................... | No | 600,000 | 10.00 | | |
| | | | | | | | | | United Chemicals............... | | | | | |
| ... | ... | ... | ... | ... | 44 | 14 | | 22,800 | $3 cum. part. pfd. ...... | No | 115,000 | 3.00 | | 7.66 |

CLEVELAND

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 55 | 55 | 55 | 94 | 55 | 96 | 91½ | 50 | | Cleve-Cliffs Iron ,$5 pfd......... | No | 498,000 | 5.00 | 11.42 | |
| 35 | 37 | 30 | 51½ | 30 | 100 | 48 | 2,984 | | Dow Chemical Co............. | No | 630,000 | 2.00 | 3.44 | 4.08 |
| 47 | 57 | 46 | 68½ | 46 | 85 | 57½ | 3,007 | 20,764 | Sherwin-Williams Co............ | 25 | 636,000 | 4.00 | Yr. Aug. '30 4.14 | |

CHICAGO

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 33½ | 28 | 39⅞ | 28 | 46¾ | 33½ | 2,300 | 13,350 | Abbott Labs.................... | No | 145,000 | 2.50 | 3.32 | 4.92 |
| 3 | 4 | 3 | 5½ | 3 | 15 | 3½ | 660 | | Monroe Chem................. | No | 126,000 | | 1.09 | 2.54 |
| ... | 27 | 24 | 33 | 24 | 35 | 15½ | 280 | 3,380 | $3.50 cum. pref............. | No | 30,000 | 3.50 | | 13.35 |
| 22¾ | 24 | 20½ | 30½ | 20½ | 33½ | 27 | 39,900 | 134,250 | Swift & Co..................... | 25 | 6,000,000 | 2.00 | 2.08 | 2.18 |

CINCINNATI

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45½ | 49 | 39¾ | 71 | 39¾ | 110 | 53½ | 29,652 | 83,409 | Procter & Gamble.............. | No | 6,410,000 | 2.40 | Yr. Je. '30 3.36 | |

PHILADELPHIA

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 53 | 55 | 53 | 71 | 52 | 100 | 89 | 315 | 3,115 | Pennsylvania Salt............... | 50 | 150,000 | 5.00 | Yr. Je. '30 7.97 | |

# *The Industry's Bonds*

| 1931 Oct. Last | 1931 Oct. High | 1931 Oct. Low | 1931 High | 1931 Low | 1930 High | 1930 Low | Sales In Oct. | Sales During 1931 | ISSUE | Date Due | Int. % | Int. Period | Out-standing $ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

NEW YORK STOCK EXCHANGE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ... | 86 | 81⅞ | 99 | 81⅞ | 100½ | 93 | 29 | 286 | Amer. Cyan. deb. 5s........................ | 1942 | 5 | A. O. | 4,554,000 |
| 74 | 84 | 60 | 102 | 60 | 177 | 94⅝ | 478 | 4,568 | Amer. I. G. Chem. conv. 5½s.................. | 1949 | 5½ | M. N. | 29,933,000 |
| 98½ | 103½ | 96½ | 104½ | 96½ | 104 | 101 | 416 | 3,788 | Am. Smelt & Ref. 1st. 5s. "A".................. | 1947 | 5 | A. O. | 36,578,000 |
| ... | 25 | 20 | 63½ | 20 | 98½ | 67 | 185 | 896 | Anglo-Chilean s. f. deb. 7s.................. | 1945 | 7 | M. N. | 14,600,000 |
| 95½ | 99⅜ | 94¾ | 103 | 99½ | 103 | 100 | 124 | 1,409 | Atlantic Refin. deb. 5s...................... | 1937 | 5 | J. J. | 14,000,000 |
| ... | ... | ... | 104 | 97 | 105½ | 100½ | | 573 | Interlake Iron Corp. 1st 5½s "A"............. | 1945 | 5½ | M. N. | 6,629,000 |
| ... | 104½ | 100 | 105⅝ | 100 | 104½ | 97½ | 14 | 151 | Corn Prod. Refin. 1st s. f. 5s.............. | 1934 | 5 | M. N. | 1,822,000 |
| 14¾ | 15 | 10 | 75½ | 6 | 87½ | 38 | 473 | 5,161 | Lautaro Nitrate conv. 6s.................... | 1954 | 6 | J. J. | 32,000,000 |
| ... | 80½ | 72 | 96 | 72 | 100½ | 87 | 127 | 1,492 | Pure Oil s. f. 5½% notes.................... | 1937 | 5½ | F. A. | 17,500,000 |
| 87½ | 89½ | 72 | 103 | 88 | 104 | 93¾ | 101 | 861 | Solvay Am. Invest. 5% notes ................ | 1942 | 5 | M. S. | 15,000,000 |
| 101⅝ | 103 | 100 | 105½ | 101¾ | 104¾ | 100 | 1,449 | 7,622 | Standard Oil, N. J. deb. 5s.................. | 1946 | 5 | F. A. | 120,000,000 |
| 94¼ | 100 | 90 | 106½ | 97¾ | 104½ | 96½ | 580 | 5,014 | Standard Oil, N. Y. deb. 4½s................. | 1951 | 4½ | J. D. | 50,000,000 |
| ... | 70 | 63 | 99 | 63 | 102½ | 90½ | 17 | 1,462 | Tenn. Corporation deb. 6s. "B"............... | 1944 | 6 | M. S. | 3,308,000 |

NEW YORK CURB

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 98½ | 102 | 97½ | 105½ | 100¼ | 104⅞ | 100⅛ | 595,000 | 2,487,000 | Aluminum Co., s. f. deb. 5s.................. | 1952 | 5 | M. S. | 37,115,000 |
| ... | 88 | 76 | 104¾ | 76 | 104½ | 96⅝ | 80,000 | 1,083,000 | Aluminum Ltd., 5s........................... | 1948 | 5 | J. J. | 20,000,000 |
| ... | 10 | 10 | 56 | 10 | 60 | 51 | 18,000 | 59,000 | Amer. Solv. & Chem. 6½s...................... | 1936 | 6½ | M. S. | 1,737,000 |
| ... | 35 | 29 | 43 | 29 | 80 | 51 | 341,000 | | General Rayon 6s. "A"........................ | 1948 | 6 | J. D. | 5,085,000 |
| ... | 100 | 40½ | 103½ | 40½ | 104 | 90½ | 324,000 | 1,047,000 | Gulf Oil, 5s................................ | 1937 | 5 | J. D. | 30,414,000 |
| 96⅝ | 99⅜ | 86 | 104 | 86 | 104 | 99 | 530,000 | 2,726,000 | Sinking Fund deb. 5s...................... | 1947 | 5 | F. A. | 35,000,000 |
| ... | 92 | 84 | 102⅞ | 84 | 103½ | 95⅝ | 216,000 | 1,779,000 | Koppers G. & C. deb, 5s..................... | 1947 | 5 | J. D. | 23,050,000 |
| 82½ | 84½ | 75 | 98⅝ | 83 | 98⅝ | 90⅝ | 241,000 | 3,278,000 | Shawinigan W. & P. 4½s. "A"................. | 1967 | 4½ | A. O. | 35,000,000 |
| ... | 83¾ | 75½ | 98½ | 83½ | 98⅝ | 90⅝ | 161,000 | 2,016,000 | 4½s., series "B"......................... | 1968 | 4½ | M. N. | 16,108,000 |
| 101½ | 104½ | 101 | 104 | 101 | 103½ | 79½ | 205,000 | 906,000 | Swift & Co., 5s............................. | 1944 | 5 | J. J. | 22,916,000 |
| ... | 102½ | 100 | 104½ | 100 | 103⅜ | 100½ | 50,000 | 270,000 | Westvaco Chlorine Prod. 5½s.................. | 1937 | 5½ | M. S. | 1,992,000 |

# The Trend of Prices

Contrary to expectations shipments in most divisions of the Chemical industry in October fell below the figures for September. Buyers continued to show a decided reluctance towards purchasing ahead in appreciable quantities. A few prices for 1932 contracts were announced, including muriatic and nitric acids, but in the main both consumers and sellers were apparently content to mark time. Both buyers and producers feel that further developments in the business situation are necessary before it is advisable to make long-time commitments.

### Prices Go Lower

The trend of prices continued downward with lower figures prevailing for acetic acid, sodium nitrate, butyl acetate, and butanol. Producers of acetic acid in announcing a lower schedule departed from a long established custom and are allowing contract customers a better figure than spot buyers. The contract season for chlorine passed off very quietly, the expected increase in the tankcar price was dropped in favor of the present level and most of the contract tonnage was quickly placed. Sulfuric acid contracts were being renewed at this year's figure, but with the proviso that adjustments would be made in the event the $6 a ton increase in the sulfur freight rate is placed in effect.

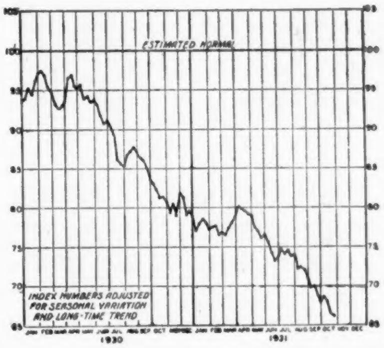
The price trend in the coal tar products, benzol, toluol, and xylol depends entirely upon the situation in the steel industry as does also the question of copperas prices. At the moment spot stocks of all of these are considerably below normal. Even a moderate increase in steel activity should not, it is reported, seriously alter the present firm prices prevailing for these commodities.

Operations in the petroleum, paper, glass and automobile industries showed no inclination to pick up. Activity in the textile and tanning fields was off slightly from the pace maintained in September but still quite favorable when comparison is made with other lines. In the fine chemical division seasonable items were in better demand, but mercury prices continued to drop at a spectacular rate. Naval stores prices reflected the improvement in most of the raw commodity markets, and both rosin and turpentine were much firmer. Oils and fats generally were also firmer, and in several instances, published prices were raised. The waxes and gums generally did not share in the better tone existing in many of the commodity markets. The one important exception was in the grades of carnauba, which went to higher levels. Despite uneasiness and uncertainty in some quarters the situation appears to be in better shape than in the corresponding period a year ago. The Chemical Markets Average Price for 20 representative chemicals is down about 9% in the past 12 months and this deflation of values should have a very salutary effect in holding prices at present levels. In addition, stocks are in many cases much smaller. The Country, having weathered through 20 months of depression, is that much nearer a turn for the better.

The outstanding feature of the general business news of October and the first few days of the current month was the sustained rise in the grain markets and to a lesser degree in petroleum. The metal markets, however, were unable to muster enough strength to go along with the tide. By many,. the upturn in the Chicago Wheatpit was looked upon as the opening gun in the return of normal conditions.

Recovery in retail trade was seriously hampered in most lines by the continuance of exceptionally warm Indian Summer in most parts of the country.

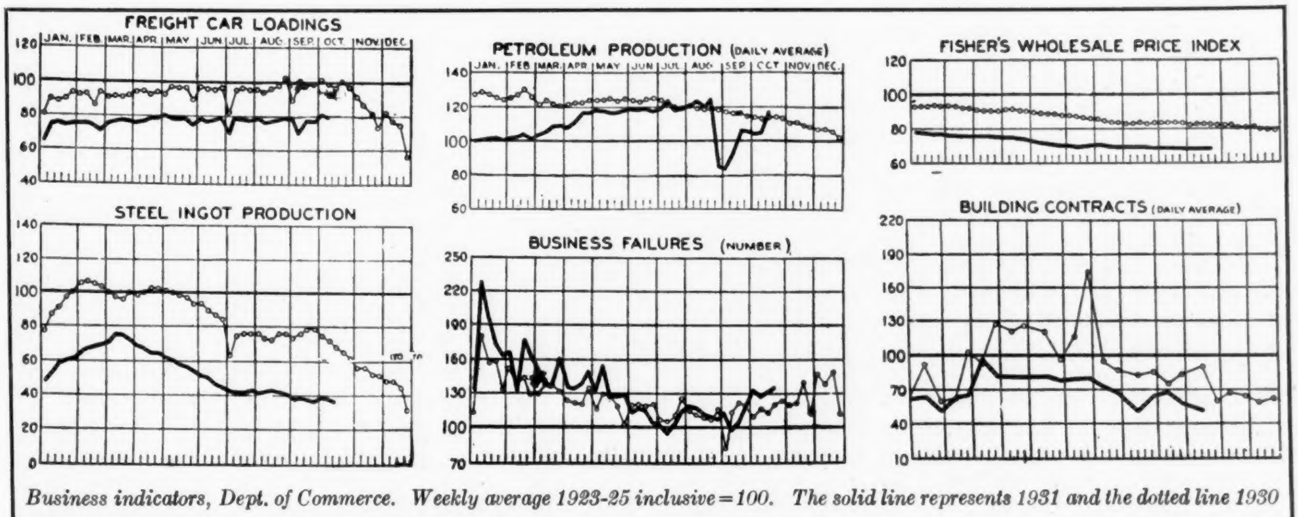
The N. Y. Times weekly index of business activity declined slightly for the week ended Oct. 24. The preliminary figure of the week, which is a new low for the current depression, was 66.2, as against the previous low of 66.4 (revised) for the preceding week and 81.5 for the corresponding week last year.




## Indices of Business

| | Latest Available Month | Previous Month | Year Ago |
|---|---|---|---|
| Automobile Production, Sept. | 140,566 | 187,197 | 220,649 |
| †Brokers Loans, Oct. 1 | $1,044 | $1,354 | $3,481 |
| *Building Contracts, Sept. | $252,109 | $233,106 | $331,863 |
| *Car Loadings, Oct. 31 | 761 | 763 | 931 |
| †Commercial Paper, Oct. 31 | $271 | $289 | $526 |
| Factory Payrolls, Sept. | 61.7 | 64.3 | 83.0 |
| *Mail Order Sales, Aug. | $43,004 | $45,093 | $50,682 |
| Number of Failures, Dun, Sept. | $47,255 | $53,025 | $46,947 |
| *Merchandise Imports, Sept. 1 | $171,000 | $166,000 | $226,312 |
| *Merchandise Exports, Sept. 1 | $181,000 | $165,000 | $311,889 |
| Furnaces in Blast %, Oct. 1 | 23.2 | 24.2 | 38.7 |
| *Steel Unfinished Orders, Sept. 30 | 3,144 | 3,169 | 3,424 |

*000 omitted. †000,000 omitted. A. May.




*Business indicators, Dept. of Commerce. Weekly average 1923-25 inclusive = 100. The solid line represents 1931 and the dotted line 1930*

# Prices Current

*Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.*

**Chemical prices quoted** are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

**Oils** are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

**Raw materials** are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

**The current range** is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

## Important Price Changes

| Advances | Oct. | Sept. |
|---|---|---|
| Blood, dried | $ 1.70 | $ 1.65 |
| Copperas | 14.50 | 14.00 |
| Turpentine | .37 | .36¼ |
| Carnauba Wax, yellow No. 1 | .33 | .30 |
| **Declines** | | |
| Acid, Acetic, 28% contract | $ 2.40 | $ 2.60 |
| Acid, Acetic glacial tanks | 8.10 | 8.98 |
| Acid, Acetelylsalicylic | 0.75 | 0.85 |
| Acid Tartaric, imp | 0.26 | 0.27 |
| Butyl Acetate, tanks | 0.146 | 0.16 |
| Butyl Alcohol, tanks | 0.1445 | 0.15 |
| Cresol, U. S. P | 0.10½ | 0.12½ |
| Dibuytl Phthalate | 0.22⅘ | 0.23⅘ |
| Para-amidoacetanilid | 0.85 | 1.05 |
| Paranitroacetanilid | 0.45 | 0.52 |
| Paraphenylenediamine | 1.25 | 1.30 |
| Quicksilver | 72.00 | 78.00 |
| Sodium Bichromate* | 0.06½ | 0.07 |
| Strontium Nitrate | 0.07 | 0.09 |
| Candelilla Wax | 0.14 | 0.14½ |

*Contract price announced Nov. 2

## Chemical Markets Av. Price Goes to New Low Level

Chemical Markets Average Price for 20 representative industrial chemicals was lower in October because of the drop in quotations on acetic acid and sodium nitrate. The September figure was .0645c against .0641c, a decline of .0004c during the month.

**Acetone** — Buying continued to reflect the reduced rate of operations in most consuming industries. No change was made in prices.

**Acid Acetic** — Leading producers effected a reduction in prices during the month in the commercial, glacial, and redistilled grades. No reduction was made by the lime makers and reductions were not uniform in the various acid grades, breaking a custom of many years standing. Also, a further reduction from the spot price was offered for contracts. The new spot price schedule follows:—Commercial, 28 per cent, barrels, $2.50 to $2.75 per 100 pounds; 56 per cent, barrels, $4.60 to $4.85; 60 per cent, barrels, $4.90 to $5.15; 70 per cent, $5.70 to $5.95; 80 per cent, barrels, $6.50 to $6.75; redistilled, 28 per cent, barrels, $2.78 to $3.03 per 100 pounds; 56 per cent, barrels, $5.15 to $5.40; 60 per cent, barrels, $5.50 to $5.75; 80 per cent, barrels, $7.29 to $7.54.

**Acid Chromic** — Automobile production showed no improvement in October with the result that no speeding up of the demand for plating supplies was in

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Acetaldehyde, drs lc-1 wks...lb. | .18½ | .21 | .18½ | .21 | .21 | .18½ | .21 | .18½ |
| Acetaldol, 50 gal dr...lb. | .27 | .31 | .27 | .31 | .31 | .27 | .31 | .27 |
| Acetamide...lb. | .95 | 1.35 | .95 | 1.35 | 1.35 | 1.20 | | |
| Acetanilid, tech, 150 lb bbl...lb. | .20 | .23 | .20 | .23 | .23 | .21 | .24 | .21 |
| Acetic Anhydride, 92-95%, 100 lb cbys...lb. | .21 | .25 | .21 | .25 | .29 | .25 | .35 | .28 |
| Acetin, tech drums...lb. | .30 | .32 | .30 | .32 | .32 | .30 | .32 | .30 |
| Acetone, tanks,...lb. | ... | .10 | .10 | .10½ | .12 | .11 | .16 | .11 |
| Acetone Oil, bbls NY...gal. | 1.15 | 1.25 | 1.15 | 1.25 | 1.25 | 1.15 | 1.25 | 1.15 |
| Acetyl Chloride, 100 lb cby...lb. | .55 | .68 | .55 | .68 | .68 | .55 | .68 | .45 |
| Acetylene Tetrachloride (see tetrachlorethane) | | | | | | | | |
| **Acids** | | | | | | | | |
| Acid Abietic | .12 | .12 | .12 | .12 | ..... | ..... | ..... | ..... |
| Acetic, 28% 400 lb bbls c-1 wks...100 lb. | 2.40 | 2.60 | 2.40 | 2.60 | 3.88 | 2.60 | 3.88 | 3.88 |
| Glacial, bbl c-1 wk...100 lb. | 8.35 | 8.60 | 8.35 | 9.23 | 13.68 | 9.23 | 13.68 | 13.68 |
| Glacial, tanks | 8.10 | ..... | 8.10 | 8.98 | 13.43 | 8.98 | | |
| Adipic | .72 | .72 | .72 | .72 | ..... | ..... | ..... | ..... |
| Anthranilic, refd, bbls...lb. | .85 | .95 | .85 | .95 | 1.00 | .85 | 1.00 | .98 |
| Technical, bbls...lb. | .65 | .70 | .65 | .80 | .80 | .75 | .80 | .80 |
| Battery, cbys...100 lb. | 1.60 | 2.25 | 1.60 | 2.25 | 2.25 | 1.60 | 2.25 | 1.60 |
| Benzoic, tech, 100 lb bbls...lb. | .35 | .45 | .35 | .45 | .53 | .40 | .60 | .51 |
| Boric, crys. powd, 250 lb. bbls...lb. | .06½ | .07 | .06½ | .07¼ | .07¼ | .06¼ | .07¼ | .05¼ |
| Broenner's, bbls...lb. | 1.20 | 1.25 | 1.20 | 1.25 | 1.25 | 1.20 | 1.25 | 1.25 |
| Butyric, 100% basis cbys...lb | .80 | .85 | .80 | .85 | .90 | .80 | .90 | .85 |
| Camphoric...lb. | ..... | 5.25 | ..... | 5.25 | 5.25 | 5.25 | 5.25 | 4.85 |
| Chlorosulfonic, 1500 lb drums wks...lb. | .04½ | .05½ | .04½ | .05½ | .05½ | .04½ | .05½ | .04½ |
| Chromic, 99¾%, drs...lb. | .14½ | .16 | .14½ | .17 | .19 | .15 | .23 | .17½ |
| Chromotropic, 300 lb bbls...lb. | 1.00 | 1.06 | 1.00 | 1.06 | 1.06 | 1.00 | 1.06 | 1.00 |
| Citric, USP, crystals, 230 lb. bbls...lb. | ..... | .35 | .35 | .43 | .59 | .40 | .70 | .46 |
| Cleve's, 250 lb bbls...lb. | .52 | .54 | .52 | .54 | .54 | .52 | .59 | .52 |
| Cresylic, 95%, dark drs NY...gal. | .47 | .60 | .47 | .60 | .70 | .54 | .54 | .60 |
| 97-99%, pale drs NY...gal. | .54 | .58 | .50 | .60 | .77 | .58 | .77 | .72 |
| Formic, tech 90%, 140 lb. cby...lb. | .10½ | .12 | .10½ | .12 | .12 | .10½ | .12 | .10½ |
| Gallic, tech, bbls...lb. | .60 | .70 | .60 | .70 | .55 | .50 | .12 | .50 |
| USP, bbls...lb. | ..... | .74 | ..... | .74 | .74 | .74 | .55 | .74 |
| Gamma, 225 lb bbls wks...lb. | .77 | .80 | .77 | .80 | .80 | .77 | .80 | .74 |
| H, 225 lb bbls wks...lb. | .60 | .65 | .60 | .70 | .70 | .65 | .99 | .80 |
| Hydriodic, USP, 10% soln cby lb. | ..... | .67 | ..... | .67 | .67 | .67 | .72 | .67 |
| Hydrobromic, 48%, coml, 155 lb cbys wks...lb. | .45 | .48 | .45 | .48 | .48 | .45 | .67 .48 | .45 |
| Hydrochloric, CP, see Acid Muriatic | | | | | ..... | ..... | ..... | ..... |
| Hydrocyanic, cylinders wks...lb. | .80 | .90 | .80 | .90 | .90 | .80 | .90 | .80 |
| Hydrofluoric, 30%, 400 lb bbls wks...lb. | ..... | .06 | ..... | .06 | .06½ | .06 | .06 | .06 |
| Hydrofluosilicic, 35%, 400 lb bbls wks...lb. | ...11 | .12 | .11 | .12 | .12 | .11 | .11 | .11 |
| Hypophosphorous, 30%, USP, demijohns...lb. | ..... | .85 | ..... | .85 | .85 | .85 | .85 | .85 |
| Lactic, 22%, dark, 500 lb bbls lb. | .04 | .04½ | .04 | .04½ | .05 | .04 | .05½ | .04½ |
| 44%, light, 500 lb bbls...lb. | .11½ | .12 | .11½ | .12 | .12 | .11 | .12½ | .11 |
| Laurent's, 250 lb bbls...lb. | .36 | .42 | .36 | .42 | .42 | .36 | .42 | .40 |
| Linoleic...lb. | .16 | .16 | .16 | 16 | ..... | ..... | ..... | ..... |
| Malic, powd., kegs...lb. | .45 | .60 | .45 | .60 | .60 | .45 | .60 | .48 |
| Metanilic, 250 lb bbls...lb. | .60 | .65 | .60 | .65 | .65 | .60 | .65 | .60 |
| Mixed Sulfuric-Nitric | | | | | | | | |
| tanks wks...N unit | .07 | .07½ | .07 | .07½ | .07½ | .07 | .07½ | .07 |
| tanks wks...S unit | .008 | .01 | .008 | .01 | .01 | .008 | .01 | .008 |
| Monochloroacetic, tech bbl...lb. | .20 | .30 | .20 | .30 | .30 | .18 | .21 | .18 |
| Monosulfonic, bbls...lb. | 1.65 | 1.70 | 1.65 | 1.70 | 1.70 | 1.65 | 1.70 | 1.65 |
| Muriatic, 18 deg, 120 lb cbys c-1 wks...100 lb. | ..... | 1.35 | ..... | 1.35 | 1.35 | 1.35 | 1.40 | 1.35 |
| tanks, wks. 100 lb. | | 1.00 | ..... | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 degrees, cbys wks...100 lb. | ..... | 1.45 | ..... | 1.45 | .... | 1.45 | .... | 1.45 |
| N & W, 250 lb bbls | .85 | .95 | .85 | .95 | .95 | .85 | .95 | .85 |
| Naphthionic, tech, 250 lb | .60 | .65 | .60 | .65 | Nom. | ..... | .59 | .55 |
| Nitric, 36 deg, 135 lb cbys c-wks...100 lb. | ..... | 5.00 | ..... | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| 40 deg, 135 lb cbys, c-1 wks...100 lb. | ..... | 6.00 | ..... | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| Oxalic, 300 lb bbls wks NY...lb. | .11 | .11½ | .10¾ | .11½ | .11¾ | .11 | .11¾ | .11 |
| Phosphoric 50%, U. S. P...lb. | ..... | .14 | ..... | .14 | .14 | .14 | .14 | .08 |
| Syrupy, USP, 70 lb drs...lb. | ..... | .14 | ..... | .14 | ] | .14 | .16 | .14 |
| Commercial, tanks,...Unit. | ..... | .80 | ..... | .80 | .80 | .80 | ..... | ..... |
| Picramic, 300 lb bbls...lb. | .65 | .70 | .65 | .70 | .70 | .65 | .70 | .65 |
| Picric, kegs...lb. | 30 | .50 | .30 | .50 | .50 | .30 | .50 | .30 |
| Pyrogallic, crystals...lb. | 1.50 | 1.60 | 1.50 | 1.60 | 1.60 | 1.30 | 1.40 | .86 |
| Salicylic, tech, 125 lb bbl...lb. | .33 | .37 | .33 | .37 | .37 | .33 | .42 | .33 |
| Sulfanilic, 250 lb bbls...lb. | .15 | .16 | .15 | .16 | .16 | .15 | .16 | .15 |
| Sulfuric, 66 deg, 180 lb cbys lc-1 wks...100 lb. | 1.60 | 1.95 | 1.60 | 1.95 | 1.95 | 1.60 | 1.95 | 1.60 |
| tanks, wks. ton | | 15.00 | ..... | 15.00 | 15.50 | 15.00 | 15.50 | 15.50 |
| 1500 lb dr wks...100 lb. | 1.50 | 1.65 | 1.50 | 1.65 | 1.65 | 1.50 | 1.65 | 1.50 |
| 60°, 1500 lb dr wks...100 lb. | 1.27½ | 1.42½ | 1.27½ | 1.42½ | 1.42½ | 1.27½ | 1.42½ | 1.27½ |

# Prices Current and Comment

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

evidence. German exports of chromic acid and sodium chromate during the first six months of 1931 were 1,773 metric tons, compared with 991 for the same period of the preceding year. The imports likewise showed marked increase from 54 metric tons to 337, the bulk of which during 1931 came from Soviet Russia. Belgium, France, the Netherlands, British India and Japan are the leading markets for the exports.

**Acid Citric** — The seasonal demand of the last few months showed further tapering off during October. The price structure showed a much firmer tendency despite the decline in shipments.

**Acid Cresylic** — Demand from disinfectant manufacturers offset the slight loss experienced in the textile lines. Prices were firm. British exports of carbolic and cresylic acids during the first six months of 1931 show a value decrease:

| | Unit | *Six Months** *1930* *Qunatity* | *Value* |
|---|---|---|---|
| Carbolic (crude)....... | cwt. | 15,360 | £24,118 |
| Carbolic (crystal)..... | cwt. | 6,700 | 23,182 |
| Cresylic............. | gals. | 748,179 | 89,964 |
| | *Unit* | *1931* *Quantity* | *Value* |
| Carbolic (crude)....... | cwt. | 24,546 | £3,228 |
| Carbolic (crystal)..... | cwt. | 7,740 | 19,975 |
| Cresylic............. | gals. | 513,182 | 52,824 |

**Acid Muriatic** — Producers were soliciting 1932 contracts on this year's prices and reported a fair amount of tonnage already booked. Shipments against existing contracts fell off in October.

**Acid Lactic** — Both the textile and tanning industries were only placing orders for small quantities for immediate shipment.

**Acid Nitric** — This year's prices were repeated for 1932. Spot sales and withdrawals against present contracts were disappointing.

**Acid Oxalic** — Routine demand remained unchanged from last month. Consumption is spotty in most lines, but prices remained firm.

**Acid Sulfuric** — The proposed plan of the I. C. C. of allowing a temporary increase of $6 a ton on sulfur has disrupted plans for the announcement of 1932 contract prices and it is very likely that producers will be forced to hold off until the roads have committed themselves to rejectance or acceptance. It is thought (see lead news story this issue page 497) that the roads will finally accept the plan. Undoubtedly this will set at rest definitely any talk of lower prices and instead may result in a higher level. At the moment consumption in most lines is off, even from the low levels of September, although some pickup is anticipated shortly in the fertilizer industry.

*Dept. of Commerce

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Oleum, 20%, 1500 lb. drs lc-1 wks ........................ton | ..... | 18.50 | ..... | 18.50 | 18.50 | 18.50 | 18.50 | 18.50 |
| 40%, lc-1 wks net .......ton | ..... | 42.00 | ..... | 42.00 | 42.00 | 42.00 | 42.00 | 42.00 |
| Tannic, tech, 300 lb bbls...lb. | .23 | .40 | .23 | .40 | .40 | .23 | .40 | .30 |
| Tartaric, USP, gran. powd, 300 lb. bbls.............lb | ..... | .26½ | .26½ | .29½ | .38½ | .33 | .38½ | .38 |
| Tobias, 250 lb bbls.........lb. | .80 | .85 | .80 | .85 | .85 | .85 | .85 | .85 |
| Trichloroacetic bottles......lb. | ..... | 2.75 | ..... | 2.75 | 2.75 | 2.75 | 2.75 | 2.75 |
| Kegs...................lb. | ..... | 2.00 | ..... | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Tungstic, bbls...............lb. | 1.40 | 1.70 | 1.40 | 1.70 | 1.70 | 1.40 | 2.25 | 1.00 |
| Albumen, blood, 225 lb bbls..lb. | .38 | .40 | .38 | .40 | .40 | .38 | 47 | .38 |
| dark,.............bbls., lb. | .12 | .20 | .12 | 20 | .20 | .12 | .20 | .12 |
| Egg, edible.................lb. | ..... | .65 | .55 | .60 | .75 | .55 | .83 | .70 |
| Technical, 200 lb cases ..lb. | .62 | .66 | .48 | .66 | .73 | .50 | .80 | .70 |
| Vegetable, edible..........lb. | .60 | .65 | .60 | .65 | .65 | .60 | .65 | .60 |
| Technical..................lb. | .50 | .55 | .50 | .55 | .55 | .50 | .55 | .50 |
| **Alcohol** | | | | | | | | |
| Alcohol Butyl, Normal, 50 gal drs c-1 wks.............lb. | .1495 | .1595 | .1495 | .17½ | .18½ | .17½ | .17¾ | .17½ |
| Drums, 1-c-1 wks........lb. | .1545 | .1645 | .1545 | .17¾ | .18¾ | .17¾ | .18¾ | .17¾ |
| Tank cars wks..........lb. | ..... | .1445 | .1445 | .16¾ | .17¾ | .16¾ | .17¾ | .16¾ |
| Amyl (from pentane) Tanks wks.............lb. | ..... | .203 | .203 | .236 | .236 | .236 | 1.67 | 1.67 |
| Diacetone, 50 gal drs del..gal. | 1.42 | 1.60 | 1.42 | 1.60 | 1.60 | 1.42 | 1.80 | 1.42 |
| Ethyl, USP, 190 pf, 50 gal bbls..................gal. | 2.55 | 2.65 | 2.37 | 2.75 | 2.75 | 2.63 | 2.75 | 2.69½ |
| Anhydrous, drums.......gal. | .54 | .58 | .54 | .60 | .71 | .56 | .71 | .71 |
| No. 5,*188 pf, 50 gal drs. drums extra.........gal. | .28 | .29 | .27 | .44 | 50 | .40 | .51 | .48 |
| *Tank, cars..............gal. | ..... | .25 | .24 | .38 | .48 | .37 | .50 | .46 |
| Isopropyl, ref, gal drs.....gal. | .60 | .65 | .60 | 1.00 | 1.00 | .60 | 1.30 | 1.00 |
| Propyl Normal, 50 gal dr..gal. | ..... | 1.00 | ..... | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Alcotate, tanks.............gal. | ..... | .60 | .60 | .60 | ..... | ..... | ..... | ..... |
| Aldehyde Ammonia, 100 gal dr lb. | .80 | .82 | .80 | .82 | .82 | .80 | .82 | .80 |
| Alpha-Naphthol, crude, 300 lb bbls...................lb. | .60 | .65 | .60 | .65 | .65 | .60 | .65 | .65 |
| Alpha-Naphthylamine, 350 lb bbls...................lb. | .32 | .34 | .32 | .34 | .34 | .32 | .34 | .32 |
| Alum Ammonia, lump, 400 lb bbls, lc-1 wks.......100 lb. | 3.00 | 3.25 | 3.00 | 3.50 | 3.50 | 3.20 | 3.50 | 3.25 |
| Chrome, 500 lb casks, wks ..................100 lb. | 4.50 | 5.25 | 4.50 | 5.25 | 5.25 | 4.50 | 5.50 | 5.00 |
| Potash, lump, 400 lb casks wks..............100 lb. | 3.00 | 3.50 | 3.00 | 3.50 | 3.50 | 3.10 | 3.50 | 3.00 |
| Soda, ground, 400 lb bbls wks..............100 lb. | 3.50 | 3.75 | 3.50 | 3.75 | 3.75 | 3.50 | 3.75 | 3.75 |
| Aluminum Metal, c-1 NY.100 lb. | 22.90 | 24.30 | 22.90 | 24.30 | 24.30 | 24.30 | 24.30 | 24.30 |
| Chloride Anhydrous,......lb. | .05 | .09 | .05 | .09 | .15 | .05 | .20 | .05 |
| Hydrate, 96%, light, 90 lb bbls...................lb. | .16 | .17 | .16 | .17 | .18 | .16 | .18 | .17 |
| Stearate, 100 lb bbls.......lb. | .20 | .21 | .18 | .22 | .26 | .19 | .26 | 25 |
| Sulfate, Iron, free, bags c-1 wks..............100 lb. | 1.90 | 1.95 | 1.90 | 1.95 | 2.05 | 1.90 | 2.05 | 1.95 |
| Coml, bags c-1 wks..100 lb. | 1.25 | 1.30 | 1.25 | 1.30 | 1.40 | 1.25 | 1.40 | 1.40 |
| Aminoazobenzene, 110 lb kegs lb. | ..... | 1.15 | ..... | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 |
| **Ammonium** | | | | | | | | |
| Ammonia anhydrous Com. tanks | ..... | .05¾ | ..... | .05¾ | .05¾ | .05¾ | | |
| Ammonia, anhyd, 100 lb cyl..lb. | .15½ | .15½ | .15½ | .15½ | .15½ | .15½ | .14½ | .14 |
| Water, 26°, 800 lb dr del...lb. | .02¾ | .03 | .02¾ | .03½ | .03½ | .03½ | .03½ | .03½ |
| Ammonia, aqua 26° tanks.... | ..... | .02¾ | .02¾ | .02¾ | .02¾ | .02¾ | | |
| Acetate.....................lb. | .28 | .39 | .28 | .39 | .39 | .28 | | |
| Bicarbonate, bbls., f.o.b. plant ...................100 lb. | ..... | 5.15 | ..... | 5.15 | 5.15 | 5.15 | 6.50 | 5.15 |
| Bifluoride, 300 lb bbls......lb. | .21 | .22 | .21 | .22 | .22 | .21 | .22 | .21 |
| Carbonate, tech, 500 lb cs..lb. | .10½ | .12 | .09 | .12 | .12 | .09 | .12 | .09 |
| Chloride, white, 100 lb. bbls wks..............100 lb. | 4.45 | 5.15 | 4.45 | 5.15 | 5.15 | 4.45 | 5.15 | 4.45 |
| Gray, 250 lb bbls wks....lb. | 5.25 | 5.75 | 5.25 | 5.75 | 5.75 | 5.25 | 5.75 | 5.25 |
| Lump, 500 lb cks spot...lb. | .11 | .11½ | .11 | .11½ | .11½ | .11 | .11½ | .11 |
| Lactate, 500 lb bbls.......lb. | .15 | .16 | .15 | .16 | .16 | .15 | .16 | .15 |
| Ammonium Linoleate.....lb. | .15 | .15 | .15 | ..... | ..... | ..... | ..... | ..... |
| Nitrate, tech, casks........lb. | .06 | .10 | .06 | .10 | .10 | .06 | .10 | .06 |
| Persulfate, 112 lb kegs.....lb. | .25 | .27½ | .25 | .30 | .30 | .26 | .34 | .26 |
| Phosphate, tech, powd, 325 lb bbls...................lb. | .11½ | .12 | .11½ | .12 | .13 | .11½ | .13 | .12½ |
| Sulfate, bulk c-1.......100 lb. | ..... | 1.25 | 1.25 | 1.80 | 2.10 | 1.75 | 2.40 | 2.05 |
| Southern points.....100 lb. | ..... | 1.25 | 1.25 | 1.75 | 2.10 | 1.82½ | 2.45 | 2.05 |
| Nitrate, 26% nitrogen 31.6% ammonia imported bags c. i. f.........ton | 34.60 | 35.00 | 34.60 | 35.00 | 57.60 | 45.00 | 60.85 | 52.40 |
| Sulfocyanide, kegs........lb. | .36 | .48 | .36 | .48 | .48 | .36 | .48 | .36 |
| Amyl Acetate, (from pentane) Tanks................lb. | ..... | .17½ | .16 | .222 | .236 | .222 | 1.70 | 1.00 |
| Tech., drs.................lb. | .17½ | .18 | .16½ | .236 | .24 | .225 | .24 | .23 |
| Alcohol, see Fusel Oil........ | | | | | | | | |
| Furoate, 1 lb tins.........lb. | | 5.00 | ..... | 5.00 | 5.00 | 5.00 | | |
| Aniline Oil, 960 lb drs........lb. | .14½ | .16 | .14½ | .16 | .16 | .15 | .16½ | .15 |
| Annatto, fine................lb. | .34 | .37 | .34 | .37 | .37 | .34 | .37 | .34 |
| Anthraquinone, sublimed, 125 lb bbls...................lb. | .50 | .55 | .50 | .55 | .90 | .50 | .90 | .80 |
| Antimony, metal slabs, ton lots ........................lb. | ..... | .06¾ | .06¾ | .07½ | .09½ | .06½ | .10 | .08¾ |
| Needle, powd, 100 lb cs....lb. | .08½ | .09 | .08½ | .09 | .09½ | .08 | .10 | .09 |
| Chloride, soln (butter of) cbys...................lb. | .13 | .17 | .13 | .17 | .17 | .13 | .18 | .13 |
| Oxide, 500 lb bbls.........lb. | .08½ | .08¾ | .08½ | .08¾ | .08¾ | .07½ | .10 | .08¾ |
| Salt, 66%, tins.............lb. | .22 | .24 | .22 | .24 | .24 | .22 | .26 | .24 |
| Sulfuret, golden, bbls......lb. | .16 | .20 | .16 | .20 | .20 | .16 | .20 | .16 |
| Vermilion, bbls............lb. | .38 | .42 | .38 | .42 | .42 | .38 | .42 | .38 |
| Archil, conc, 600 lb bbls......lb. | .17 | .19 | .17 | .19 | .19 | .17 | .19 | .17 |
| Double, 600 lb bbls........lb. | .12 | .14 | .12 | .14 | .14 | .12 | .14 | .12 |
| Triple, 600 lb bbls.........lb. | .12 | .14 | .12 | .14 | .14 | .12 | .16 | .12 |
| Argols, 80%, casks..........lb. | ..... | .18¾ | ..... | .18¾ | .18¾ | .18¾ | .18¾ | .18¾ |
| Crude, 30%, casks........lb. | .07 | .07½ | .07 | .08 | .08 | .07¾ | .08 | .08 |

*New formula

# Prices Current and Comment

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

**Alcohol** — Movement of anti-freeze was reported to be holding up in fair volume and with a change from the rather warm weather that has prevailed in most sections to date further improvement was looked for. Demand from other consuming lines was considerably below normal.

**Alums** — Demand for water purification has held up better than was expected, but sales to the paper industry are reported as being off further from the September low. The price structure remained firm and unchanged.

**Ammonia Anhydrous** — Consumption again slumped in October but still remains in fair demand due to the rather warm weather prevailing in most sections of the country. No indication of next year's prices has as yet been made.

**Ammonia Aqua** — A fair demand was in evidence from the textile centers and prices remained firm and unchanged.

**Ammoniac Sal** — A rather steady demand was in evidence throughout the entire month.

**Sal Soda** — Some slackening off was reported from most consuming lines. Contract prices were withheld pending announcement of soda ash prices for 1932.

**Ammonium Sulfate** — Imported material was reported as being offered at $21 to $23 ex vessel at the ports. Some question exists as to what effect the expected ruling from Washington on dumping will have and it was said that the $23 price was protected against assessments. The market for domestic was reported as $25 to $26 a ton depending upon the seller. Actual tonnage of either the domestic or imported changing hands was limited to small purchases. Total imports of sulphate of ammonia into the United States during the first eight months of 1931 reached 42,945 long tons, compared with 34,964 tons in the entire year 1930. Imports this year by countries follow:

| | *Tons* |
|---|---|
| Belgium* | 9,411 |
| France | 578 |
| Germany | 7,729 |
| Netherlands | 15,133 |
| Canada | 1,862 |
| Japan | 8,232 |
| Total | 42,945 |

**Amyl Acetate** — Commercial grade was being quoted at 16½c in tanks, 17½c-18c in drums. High test was being quoted at 17½c in tanks, 18½c-19c in drums. Imports of ethers and esters containing not more than 10 per cent of alcohol entered for consumption in the United States during the first seven months of this year compared with similar receipts during the corresponding period in 1930 as follows:

*Dept. of Commerce

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Aroclors, wks....lb. | .20 | .40 | .20 | .40 | .40 | .20 | ..... | ..... |
| Arsenic, Red. 224 lb kegs, cs..lb. | .09⅜ | .10 | .09⅜ | .10 | .11 | .08¾ | .11 | .09 |
| White, 112 lb kegs....lb. | .04 | .05 | .03¾ | .05 | .04½ | .03¾ | .04½ | .04 |
| Asbestine, c-1 wks....ton | ..... | 15.00 | ..... | 15.00 | 15.00 | 15.00 | 15.00 | 4.75 |
| **Barium** | | | | | | | | |
| Barium Carbonate, 200 lb bags wks....ton | 56.50 | 57.00 | 56.50 | 60.00 | 60.00 | 58.00 | 60.00 | 57.00 |
| Chlorate, 112 lb kegs NY..lb. | .14 | .15 | .14 | .15 | .15 | .14 | .15 | .14 |
| Chloride, 600 lb bbl wks...ton | 63.00 | 69.00 | 63.00 | 69.00 | 69.00 | 63.00 | 69.00 | 63.00 |
| Dioxide, 88%, 690 lb drs...lb. | .12 | .13 | .12 | .13 | .13 | .12 | .13 | .12 |
| Hydrate, 500 lb bbls....lb. | .04¾ | .05½ | .04¾ | .05½ | .05½ | .04¾ | .05½ | .04¾ |
| Nitrate, 700 lb casks....lb. | .07¼ | .08 | .07¼ | .08½ | .08½ | .07½ | .08½ | .08 |
| Barytes, Floated, 350 lb bbls wks....ton | 23.00 | 24.00 | 23.00 | 24.00 | 24.00 | 23.00 | 24.00 | 23.00 |
| Bauxite, bulk, mines....ton | 5.00 | 6.00 | 5.00 | 8.00 | 8.00 | 5.00 | 8.00 | 5.00 |
| Beeswax, Yellow, crude bags..lb. | .22 | .24 | .22 | .31 | .34 | .24 | .37 | .34 |
| Refined, cases....lb. | .25 | .28 | .25 | .37 | .38 | .37 | .42 | .39 |
| White, cases....lb. | .34 | .36 | .34 | .36 | .53 | .34 | .53 | .51 |
| Benzaldehyde, technical, 945 lb drums wks....lb. | .60 | .65 | .60 | .65 | .65 | .60 | .65 | .60 |
| **Benzene** | | | | | | | | |
| Benzene, 90%, Industrial, 8000 gal tanks wks....gal. | ..... | .20 | .18 | .21 | .22 | .21 | .23 | .23 |
| Ind. Pure, tanks works....gal. | ..... | .20 | .18 | .21 | .22 | .21 | .23 | .23 |
| Benzidine Base, dry, 250 lb bbls....lb. | .65 | .67 | .65 | .67 | .74 | .65 | .74 | .70 |
| Benzoyl, Chloride, 500 lb drs.lb. | .45 | .47 | .45 | .47 | 1.00 | .45 | 1.00 | 1.00 |
| Benzyl, Chloride, tech drs....lb. | ..... | .30 | ..... | .30 | .25 | .25 | .25 | .25 |
| Beta-Naphthol, 250 lb bbl wk.lb. | .22 | .24 | .22 | .24 | .24 | .22 | .26 | .22 |
| Naphthylamine, sublimed, 200 lb bbls....lb. | 1.25 | 1.35 | 1.25 | 1.35 | 1.35 | 1.25 | 1.35 | 1.35 |
| Tech, 200 lb bbls....lb. | .53 | .58 | .53 | .65 | .65 | .53 | .68 | .60 |
| Blanc Fixe, 400 lb bbls wks..ton | 75.00 | 90.00 | 75.00 | 90.00 | 90.00 | 75.00 | 90.00 | 75.00 |
| **Bleaching Powder** | | | | | | | | |
| Bleaching Powder, 300 lb drs c-1 wks contract....100 lb. | 1.75 | 2.00 | 1.75 | 2.35 | 2.35 | 2.00 | 2.25 | 2.00 |
| Blood, Dried, fob, NY....Unit | ..... | 1.75 | 1.65 | 3.00 | 3.90 | 3.00 | 4.60 | 3.90 |
| Chicago....Unit | 1.50 | 1.60 | 1.50 | 2.35 | 4.50 | 2.75 | 5.00 | 4.40 |
| S. American shipt....Unit | ..... | Nom. | 2.00 | 3.20 | 4.10 | 3.15 | 4.70 | 4.25 |
| Blues, Bronze Chinese Milori Prussian Soluble....lb. | ..... | .35 | ..... | .35 | .35 | .35 | .35 | .32 |
| Bone, raw, Chicago....ton | 23.00 | 24.00 | 23.00 | 32.00 | 39.00 | 31.00 | 42.00 | 39.00 |
| Bone, Ash, 100 lb kegs....lb. | .06 | .07 | .06 | .07 | .07 | .06 | .07 | .06 |
| Black, 200 lb bbls....lb. | .05½ | .08½ | .05½ | .08½ | .08½ | .05½ | .08½ | .08½ |
| Meal, 3% & 50%, Imp....ton | ..... | 21.00 | 21.00 | 31.00 | 31.00 | 31.00 | 35.00 | 30.00 |
| Borax, bags....lb. | .02½ | .03½ | .02½ | .03½ | .03½ | 02½ | .03½ | .02½ |
| Bordeaux, Mixture, 16% pwd..lb. | .11½ | .13 | .11½ | .13 | .14 | .12 | .14 | .10½ |
| Paste, bbls....lb. | .11½ | .13 | .11½ | .13 | .14 | .12 | .14 | .10 |
| Brazilwood, sticks, shpmt....lb. | 26.00 | 28.00 | 26.00 | 28.00 | 28.00 | 26.00 | 28.00 | 26.00 |
| Bromine, cases....lb. | .36 | .43 | .36 | .43 | .47 | .38 | | |
| Bronze, Aluminum, powd blk.lb. | .60 | 1.20 | .60 | 1.20 | 1.20 | .60 | 1.20 | .60 |
| Gold bulk....lb. | .55 | 1.25 | .55 | 1.25 | 1.25 | .55 | 1.25 | .55 |
| Butyl, Acetate, normal drs..lb. | .161 | .166 | .161 | .175 | .20 | .17 | .195 | .184 |
| Tank, wks....lb. | ..... | .146 | .146 | .175 | .186 | .16 | .186 | .181 |
| Aldehyde, 50 gal drs wks...lb. | .34 | .36 | .34 | .44 | .44 | .34 | .70 | .34 |
| Carbitol s ee Diethylene Glycol Mono (Butyl Ether)........ | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cellosolve (see Ethylene glycol mono b utyl ether)........ | | | | | | | | |
| Furoate, tech., 50 gal. dr., lb. | ..... | .50 | ..... | .50 | .50 | .50 | .50 | .50 |
| Propionate, drs....lb. | .22 | .25 | .22 | .25 | .27 | .22 | .36 | .25 |
| Stearate, 50 gal drs....lb. | ..... | .25½ | .25 | .30 | .30 | .25 | .60 | .25 |
| Tartrate, drs....lb. | .55 | .60 | .55 | .60 | .60 | .55 | .60 | .57 |
| Cadmium, Sulfide, boxes....lb. | .65 | .90 | .65 | .90 | 1.75 | .90 | 1.75 | .75 |
| **Calcium** | | | | | | | | |
| Calcium, Acetate, 150 lb bags c-1....100 lb. | ..... | 2.00 | ..... | 2.00 | 4.50 | 2.00 | 4.50 | 4.50 |
| Arsenate, 100 lb bbls c-1 wks....lb. | .06 | .08 | .C6 | .09 | .09 | .07 | .09 | .07 |
| Carbide, drs....lb. | .05 | .06 | .05 | .06 | .06 | .05 | .06 | .05 |
| Carbonate, tech, 100 lb bags c-1....lb. | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Chloride, Flake, 375 lb drs c-1 wks....ton | ..... | 22.75 | ..... | 22.75 | 22.75 | 22.75 | 25.00 | 22.75 |
| Solid, 650 lb drs c-1 fob wks ....ton | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Nitrate, 100 lb bags....ton | 34.00 | 35.00 | 34.00 | 43.00 | 43.00 | 40.00 | 52.00 | 42.00 |
| Peroxide, 100 lb. drs....lb. | ..... | 1.25 | ..... | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Phosphate, tech, 450 lb bbls lb. | .08 | .08¾ | .08 | .08¾ | .08¾ | .08 | .08 | .07 |
| Stearate, 100 lb bbls....lb. | .17 | .18 | .17 | .22 | .26 | .19 | .26 | .25 |
| Calurea, bags S. points. c.i.f. ton | ..... | 88.65 | ..... | 88.65 | 88.65 | 88.65 | 88.15 | 82.15 |
| Camwood, Bark, ground bbls..lb. | ..... | .18 | ..... | .18 | .18 | .18 | .18 | .18 |
| Candelilla Wax, bags....lb. | .13 | .13½ | .13 | .15 | .20 | .15 | .24 | .22 |
| Carbitol, (See Diethylene Gycol Mono Ethyl Ether)....... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Carbon, Decolorizing, 40 lb bags c-1....lb. | .08 | .15 | .08 | .15 | .15 | .08 | .15 | .08 |
| Black, 100-300 lb cases 1c-1 NY....lb. | .06 | .12 | .06 | .12 | .12 | .06 | .12 | .12 |
| Bisulfide, 500 lb drs 1c-1 NY....lb. | .05½ | .06 | .05½ | .06 | .06 | .05½ | .06 | .05½ |
| Dioxide, Liq. 20-25 lb cyl...lb. | ..... | .06 | ..... | .06 | .18 | .06 | .06 | .06 |
| Tetrachloride, 1400 lb drs delivered....lb. | .06½ | .07 | .06½ | .07 | .07 | .06½ | .07½ | .06½ |
| Carnauba Wax, Flor, bags....lb. | .26 | .28 | .26 | .28 | .37 | .28 | .43 | .35 |
| No. 1 Yellow, bags....lb. | ..... | .33 | .23 | .40 | .33 | .25 | .40 | .33 |
| No. 2 N Country, bags....lb. | .17 | .17¾ | .15 | .23 | .27 | .20 | .32 | .28 |
| No. 2 Regular, bags....lb. | ..... | .36 | .21 | .23 | .30 | .23 | .36 | .31 |
| No. 3 N. C....lb. | .11 | .14½ | .13½ | .11 | .23 | .16 | .25 | .24 |
| No. 3 Chalky....lb. | .11 | .12 | .13½ | .11 | .23 | .16 | .26 | .24 |
| Casein, Standard, Domestic.... ground....lb. | .07 | .07½ | .06 | .10 | .15½ | .09½ | .17 | .15 |

# Prices Current and Comment

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

| | *Seven Months** 1931 Lbs. | 1931 *Value* | 1930 *Lbs.* | 1930 *Value* |
|---|---|---|---|---|
| Amyl acetate.... | 696 | $213 | 93 | $58 |
| Amyl nitrate.... | .... | .... | 110 | 144 |
| Diethyl sulphate and dimethyl sulphate...... | 550 | 165 | 12,249 | 2,591 |
| Ethers and esters, n.s.p.f......... | 68,208 | 18,954 | 105,617 | 38,710 |
| Ethyl acetate.... | 2,249 | 745 | 1,581 | 188 |
| Ethyl chloride... | 551 | 475 | 4 | 5 |
| Ethyl ether...... | 500 | 104 | 3,820 | 624 |

No imports of butyl acetate, of which 374,819 pounds, valued at $47,512, was imported in the first seven months of 1930, were recorded this year. No imports of ethyl chlorocarbonate, ethyl hydrogen sulphate, or ethers or esters containing more than 20 per cent of alcohol, were recorded.

**Argols** — Buying remained at a very low ebb throughout the entire month as consumers held strictly to the policy of making only replacement purchases. No change in quoted prices was made.

**Arsenic** — Some business of fairly large tonnage was reported as closed with insecticide manufacturers and glass producers, but generally trade was off and buying limited to small quantities for replacement.

**Benzol** — Stocks remained at a minimum in the face of continued curtailed operations in the steel industry. Prices were exceptionally firm.

**Bleaching Powder** — Demand was only routine, but with prices holding at firm levels.

**Dried Blood** — The disorganized condition of this market corrected itself during October and the price went to $1.70 per unit.

**Butyl Acetate** — Producers announced October 16, further reductions in the schedule for Butyl Acetate as follows: tanks, 14.6c; tank wagon, 15.6c; 5 drum shipments, 16.1c; ¼ drums, 16.6c, freight allowed. These prices are offered for all or any part of 1932.

**Butyl Alcohol** — Producers announced a substantial reduction in price during October bringing the new tank car price level down to 14.45c. In sympathy declines were registered in butyl nitrate and butyl acetate.

**Camphor** — Demand from most consuming industries remained unchanged. Despite restricted buying in many quarters, the figures for 1931 imports show a gain over 1930. Imports of natural crude camphor during the eight months period ended August 31, 1931, amounted to 1,272,800 pounds valued at $460,500 as compared with 621,700 pounds valued at $247,000 in the corresponding period of 1930. Purchases of natural refined camphor increased from 668,600 pounds valued at $379,500 in the 1930 period to 821,000 pounds worth $395,200 in 1931.

*Dept. of Commerce

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Cellosolve (see Ethylene glycol mono ethyl ether)......... | | | | | | | | |
| Acetate (see Ethylene glycol mono ethyl ether acetate).. | | | | | | | | |
| Celluloid, Scraps, Ivory cs....lb. | .13 | .15 | .13 | .15 | .20 | .20 | .30 | .20 |
| Shell, cases...............lb. | .18 | .20 | .18 | .20 | .20 | .18 | .20 | .18 |
| Transparent, cases........lb. | ..... | .15 | ..... | .15 | .15 | .15 | .32 | .15 |
| Cellulose, Acetate, 50 lb kegs .lb. | .80 | 1.25 | .80 | 1.25 | 1.25 | .80 | 1.25 | 1.20 |
| Chalk, dropped, 175 lb bbls...lb. | .03 | .03½ | .03 | .03½ | .03½ | .03 | .03½ | .03 |
| Precip, heavy, 560 lb cks...lb. | .02 | .03½ | .02 | .03½ | .03½ | .02 | .03½ | .02 |
| Light, 250 lb casks........lb. | .02½ | .03½ | .02½ | .03½ | .03½ | .02½ | .03½ | .02½ |
| Charcoal, Hardwood, lump, bulk wks...................bu. | .18 | .19 | .18 | .19 | .19 | .18 | .19 | .18 |
| Willow, powd, 100 lb bbl wks.....................lb. | .06 | .06½ | .06 | .06½ | .06½ | .06 | .06½ | .06 |
| Wood, powd, 100 lb bbls...lb. | .04 | .05 | .04 | .05 | .05 | 04 | .05 | .04 |
| Chestnut, clarified bbls wks,..lb. | .01¼ | .02 | .01¼ | .03 | .03 | .02½ | .02 | .03½ |
| 25% tks wks..............lb. | .01¼ | .02½ | .01¼ | .02½ | .02½ | .01¼ | .02½ | .01½ |
| Powd, 60%, 100 lb bgs wks.lb. | ..... | .04½ | ..... | .04½ | .04½ | .04½ | .04 4/5 | .04½ |
| Powd, decolorized bgs wks..lb. | .05½ | .06 | .05½ | .06 | .06 | .05½ | .06 | .05½ |
| China Clay, lump, blk mines.ton | 8.00 | 9.00 | 8.00 | 9.00 | 9.00 | 8.00 | 9.00 | 8.00 |
| Powdered, bbls............lb. | .01½ | .02 | .01½ | .02 | .02 | .01½ | .02 | .01½ |
| Pulverized, bbls wks......ton | 10.00 | 12.00 | 10.00 | 12.00 | 12.00 | 10.00 | 12.00 | 10.00 |
| Imported, lump, bulk.....ton | 15.00 | 25.00 | 15.00 | 25.00 | 25.00 | 15.00 | 25.00 | 15.00 |
| Powdered, bbls............lb. | .01½ | .03 | .01½ | .03 | .03 | .01½ | .03½ | .01½ |
| **Chlorine** | | | | | | | | |
| Chlorine, cyls 1c-1 wks contract ........................lb. | .07 | .08½ | .07 | .08½ | .08½ | .07 | .08½ | .07 |
| cyls, cl wks,. contract ...lb. | .04 | .04½ | .04 | .04½ | .04½ | .04 | .04½ | .04½ |
| Liq tank or multi-car lot cyls wks contract............lb. | .01¾ | .02½ | .01¾ | .02½ | .025 | .01¾ | .03 | .025 |
| Chlorobenzene, Mono, 100 lb. drs 1c-1 wks............lb. | .10 | .10½ | .10 | .10½ | .10½ | .10 | .10½ | .08½ |
| Chloroform, tech, 1000 lb drs..lb. | .15 | .16 | .15 | .16 | .16 | .15 | .20 | .16 |
| Chloropicrin, comml cyls.....lb. | 1.00 | 1.35 | 1.00 | 1.35 | 1.35 | 1.00 | 1.35 | 1.00 |
| Chrome, Green, CP..........lb. | .26 | .29 | .26 | .29 | .29 | .26 | .29 | .26 |
| Commercial...............lb. | .06½ | .11 | .06½ | .11 | .11 | .06½ | .11 | .06½ |
| Yellow...................lb. | .16 | .18 | .16 | .18 | .18 | .16 | .18 | .15 |
| Chromium, Acetate, 8% Chrome bbls....................lb. | .04¾ | .05¾ | .04¾ | .05¾ | .05¾ | .04¾ | .05¾ | .04¾ |
| 20° soln, 400 lb bbls.....lb. | ..... | .05½ | ..... | .05½ | .05½ | .05½ | .05½ | .05½ |
| Fluoride, powd, 400 lb bbl..lb. | .27 | .28 | .27 | .28 | .28 | .27 | .28 | .27 |
| Oxide, green, bbls.........lb. | .34½ | .35½ | .34½ | .35½ | .35½ | .34½ | .35½ | .34½ |
| Coal tar, bbls..............bbl | 10.00 | 10.50 | 10.00 | 10.50 | 10.50 | 10.00 | 10.50 | 10.00 |
| Cobalt Oxide, black, bags....lb. | 1.35 | 1.45 | 1.35 | 2.22 | 2.22 | 2.10 | 2.22 | 2.10 |
| Cochineal, gray or black bag..lb. | .52 | .57 | .52 | .57 | 1.01 | .52 | 1.01 | .95 |
| Teneriffe silver, bags.......lb. | ..... | .57 | .55 | .57 | .95 | .54 | .95 | .95 |
| **Copper** | | | | | | | | |
| Copper, metal, electrol....100 lb. | 7.00 | 7.50 | 7.00 | 10.36 | 17.78 | 9.50 | 24.00 | 17.00 |
| Carbonate, 400 lb bbls.....lb. | .08½ | .16½ | .08½ | .16½ | .21½ | .08½ | .25 | .13 |
| Chloride, 250 lb bbls.......lb. | .22 | .25 | .22 | .25 | .28 | .22 | .28 | .25 |
| Cyanide, 100 lb drs........lb. | .41 | .42 | .41 | .42 | .45 | .41 | .60 | .44 |
| Oxide, red, 100 lb bbls.....lb. | .15 | .16 | .15 | .18 | .32 | .15½ | .32 | .16½ |
| Sub-acetate verdigris, 400 lb bbls...................lb. | .18 | .19 | .18 | .19 | .19 | .18 | .19 | .18 |
| Sulfate, bbls c-1 wks...100 lb. | ..... | 3.40 | 3.40 | 4.95 | 5.50 | 3.95 | 7.00 | 5.50 |
| Copperas, crys and sugar bulk c-1 wks...............ton | ..... | 14.50 | 13.00 | 14.00 | 14.00 | 13.00 | 14.00 | 13.00 |
| Cotton, Soluble, wet, 100 lb bbls...................lb. | .40 | .42 | .40 | .42 | .42 | .40 | .42 | .40 |
| Cottonseed, S. E. bulk c-1...ton | ..... | 26.50 | ..... | 26.50 | ..... | ..... | ..... | ..... |
| Meal S. E. bulk..........ton | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 7% Amm., bags mills...ton | 13.25 | 38.00 | 13.25 | 38.00 | 38.00 | 37.50 | 38.00 | 37.50 |
| Cream Tartar, USP, 300 lb. bbls...................lb. | ..... | .21¾ | .21¾ | .24½ | .27 | .24½ | .28 | 26½ |
| Creosote, USP, 42 lb cbys....lb. | .40 | .42 | .40 | .42 | .42 | .40 | .42 | .40½ |
| Oil, Grade 1 tanks.......gal. | .11½ | .12½ | .11½ | .14 | .16 | .15 | .19 | .15 |
| Grade 2...............gal. | .10½ | .11½ | .10½ | .12 | .14 | .13 | .23 | .13 |
| Grade 3...............gal. | .10½ | .11½ | .10½ | .12 | .14 | .13 | .28 | .13 |
| Cresol, USP, drums..........lb. | .10½ | .11 | .10½ | .17 | .17 | .14 | .17 | .14 |
| Crotonaldehyde, 50 gal dr....lb. | .32 | .36 | .32 | .36 | .36 | .32 | .36 | .32 |
| Cudbear, English............lb. | .16 | .17 | .16 | .17 | .17 | .16 | .17 | .16 |
| Cutch, Rangoon, 100 lb bales..lb. | .10 | .12 | .10 | .13 | .13 | .11 | .16 | .12½ |
| Borneo, Solid, 100 lb bale..lb. | .05½ | .07 | .05½ | .08½ | .08½ | .06½ | .08½ | .08 |
| Cyanamide, bags c-1 frt allowed Ammonia unit............ | ..... | .97½ | .97½ | ..... | ..... | ..... | ..... | ..... |
| Dextrin, corn, 140 lb bags.100 lb. | ..... | 3.72 | 3.47 | 4.02 | 4.82 | 4.42 | 4.92 | 4.62 |
| White, 140 lb bags.....100 lb. | 3.42 | 3.67 | 3.42 | 4.02 | 4.77 | 4.17 | 4.87 | 4.57 |
| Potato, Yellow, 220 lb bgs..lb. | .08 | .09 | .08 | .09 | .09 | .08 | .09 | .08 |
| White, 220 lb bags 1c-1....lb. | .08 | .09 | .08 | .09 | .09 | .08 | .09 | .08 |
| Tapioca, 200 lb bags 1c-1...lb. | .08½ | .08¾ | .08½ | .08¾ | .08½ | .08 | .08½ | .08 |
| Diamylphthalate, drs wks...gal. | ..... | 3.80 | ..... | 3.80 | 3.80 | 3.80 | 3.80 | 3.80 |
| Dianisidine, barrels..........lb. | 2.35 | 2.70 | 2.35 | 2.70 | 2.70 | 2.35 | 3.10 | 2.70 |
| Dibutylphthalate, wks.......lb. | .228 | .23 | .228 | .28 | .28 | .24½ | .26½ | .26½ |
| Dibutyltartrate, 50 gal drs....lb. | .29½ | .31½ | .29½ | .31½ | .31½ | .29½ | .31½ | .29½ |
| Dichloroethylether, 50 gal drs lb. | ..... | .06 | ..... | .06 | .07 | .05 | .13 | .05 |
| Dichloromethane, drs wks....lb. | .55 | .65 | .55 | .65 | .65 | .55 | .65 | .55 |
| Diethylamine, 400 lb drs.....lb. | 2.75 | 3.00 | 2.75 | 3.00 | 3.00 | 2.75 | 3.00 | 2.75 |
| Diethylcarbonate, drs ......gal. | 1.85 | 1.90 | 1.85 | 1.90 | 1.90 | 1.85 | 1.90 | 1.85 |
| Diethylaniline, 850 lb drs.....lb. | .55 | .60 | .55 | .60 | .60 | .55 | .60 | .55 |
| Diethyleneglycol, drs........lb. | .14 | .16 | .14 | .16 | .13 | .10 | .13 | .10 |
| Mono ethyl ether, drs....lb. | .15 | .16 | .15 | .16 | .16 | .13 | .15 | .13 |
| Mono butyl ether, drs....lb. | .24 | .30 | .24 | .30 | .30 | .24 | .30 | .25 |
| Diethylene oxide, 50 gal dr....lb. | ..... | .50 | ..... | .50 | .50 | .50 | .50 | .50 |
| Diethylorthotoluidin, drs.....lb. | .64 | .67 | .64 | .67 | .67 | .64 | .67 | .64 |
| Diethyl phthalate, 1000 lb drums.................lb. | .23 | .26 | .23 | .26 | .26 | .24 | .26 | .24 |
| Diethylsulfate, technical, 50 gal drums.................lb. | .30 | .35 | .30 | .35 | .35 | .30 | .35 | .30 |
| Dimethylamine, 400 lb drs...lb. | ..... | 2.62 | ..... | 2.62 | 2.62 | 2.62 | 2.62 | 2.62 |
| Dimethylaniline, 340 lb drs...lb. | .25 | .27 | .25 | .28 | .28 | .26 | .32 | .26 |

# *Prices Current and Comment*

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

**Carbon Black** — No change has occurred in several months in the conditions governing this market. Producers were holding at 3c, mines, Texas for standard grades. It is thought that little movement one way or the other is possible for the present.

**Chlorine** — Producers announced 1932 prices during the month, making no change despite rumors of an attempt to raise prices more in line with production costs. Large consumers were closed almost immediately and the price level remained firm. With a number of large tonnage contracts running for two years (through 1932) manufacturers determined it would be inadvisable to make any change in prices this season.

**Coaltar Acids** — The market passed through a very spotty period. Anthranilic was in fair demand but benzoic, picric, salicylic, and sulfanilic moved only in small lots.

**Copals** — Grades in this group were in fair demand with prices held at last month's levels. Total imports of gum copal at Singapore for the second quarter of 1931 amounted to 95 tons, a loss of 242 tons from the corresponding quarter of 1930, according to the consul at Antwerp. The exports from Singapore were 136 tons, against 252 tons in the 1930 quarter.

**Copper** — Demand increased during the month in anticipation of further curtailment in production as a result of the international conference now in session in New York. Production in September was 86,704 tons, as compared with 90,190 tons in August and 116,004 tons in September 1930, according to American Bureau of Metal Statistics. Production of primary copper by the mines in the United States for September amounted to 38,088 tons, against 38,925 tons in August and 56,584 tons in September, 1930. Shipments from mines in North and South America totaled 62,583 tons in September, compared with 74,832 tons in August and 103,043 tons in September, 1930.

**Copperas** — With the steel industry failing to make any appreciable gain in activity, producers of copperas reported still further reduction in reserve stocks and an advance of 50c a ton.

**Copper Sulfate** — The market for this item passed through a rather quiet period. Tonnage figures for the year, however, compare very favorably with last year. The copper conference has before it the suggestion of a further 25% cut in production and it is quite likely that this will be agreed upon with the hope of forcing the metal price up from the 7c low figure. Any increase in the metal will of course be reflected in the sulfate market.

| | Current Market | | 1931 | | 1930 | | 1929 | |
|---|---|---|---|---|---|---|---|---|
| | | | Low | High | High | Low | High | Low |
| Dimethylsulfate, 100 lb drs...lb. | .45 | .50 | .45 | .50 | .50 | .45 | 50 | .45 |
| Dinitrobenzene, 400 lb bbls...lb. | .15 | .16 | .15 | .16½ | .16½ | .15½ | 16½ | .15 |
| Dintrochlorobenzene, 400 lb bbls...lb. | .13 | .15 | .13 | .15 | .15 | .13 | .15 | .1 |
| Dinitronaphthalene, 350 lb bbls ...lb. | .34 | .37 | .34 | .37 | .37 | .34 | .37 | .34 |
| Dinitrophenol, 350 lb bbls...lb. | .29 | .30 | .29 | .30 | .32 | .31 | .32 | .31 |
| Dinitrotoluene, 300 lb bbls...lb. | .16 | .17 | .16 | .17 | .18 | .16 | .19 | .17 |
| Diorthotolyguanidine, 275 lb bbls wks...lb. | .42 | .46 | .42 | .46 | .46 | .42 | .49 | .42 |
| Dioxan (See Diethylene Oxide) | ..... | ..... | ..... | ..... | ... | ..... | ..... | ..... |
| Diphenyl...lb. | .20 | .40 | .20 | .40 | .50 | .20 | .50 | .40 |
| Diphenylamine...lb. | .37 | .38 | .37 | .38 | .40 | .38 | .47 | .40 |
| Diphenylguanidine, 100 lb bbl lb. | .30 | .35 | .30 | .35 | .35 | .30 | .40 | .39 |
| Dip Oil, 25%, drums...lb. | .26 | .30 | .26 | .30 | .30 | .26 | .30 | .26 |
| Divi Divi pods, bgs shipmt..ton | 29.00 | 30.00 | 28.00 | 35.00 | 46.50 | 35.00 | 57.00 | 46.50 |
| Extract...lb. | .05 | .05½ | .05 | .05½ | .05½ | .05 | .05½ | .05 |
| Egg Yolk, 200 lb cases...lb. | .46 | .50 | .45 | .58 | .80 | .72 | .84 | .77 |
| Epsom Salt, tech, 300 lb bbls c-1 NY...100 lb. | 1.70 | 1.90 | 1.70 | 1.90 | 1.90 | 1.70 | 1.90 | 1.70 |
| Ether, USP anaesthesia 55 lb. drs. ...lb. | ..... | .23 | .23 | .28 | .28 | .21 | .39 | .38 |
| USP (Conc.)...lb. | .09 | .10 | .09 | .10 | ..... | ..... | ..... | ..... |
| Ethyl Acetate, 85% Ester, ... tanks...lb. | .06½ | .07 | .06½ | .088 | .115 | .085 | .122 | .108 |
| drums...lb. | .08 | .09 | .08 | .10 | .158 | .094 | .129 | .111 |
| Anhydrous, tanks...lb. | ..... | .075 | .075 | .119 | .142 | .119 | | |
| drums...lb. | ..... | .085 | .085 | .121 | .156 | .115 | | |
| Acetoacetate, 50 gal drs...lb. | .65 | .68 | .65 | .68 | .68 | .65 | .68 | .65 |
| Benzylaniline, 300 lb drs...lb. | .88 | .90 | .88 | .90 | 1.11 | .88 | 1.11 | 1.05 |
| Bromide, tech, drums...lb. | .50 | .55 | .50 | .55 | .55 | .50 | .55 | .50 |
| Carbonate, 90%, 50 gal drs gal. | 1.85 | 1.90 | 1.85 | 1.90 | 1.90 | 1.85 | 1.90 | 1.85 |
| Chloride, 200 lb. drums...lb. | ..... | .22 | ..... | .22 | .22 | .22 | .22 | .22 |
| Chlorocarbonate, cbys...lb. | ..... | .30 | ..... | .30 | .40 | .30 | .40 | .35 |
| Ether, Absolute, 50 gal drs..lb. | .50 | .52 | .50 | .52 | .52 | .50 | .52 | .50 |
| Furoate, 1 lb tins...lb. | ..... | 5.00 | ..... | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Lactate, drums works...lb. | .25 | .29 | .25 | .29 | .29 | .25 | .35 | .25 |
| Methyl Ketone, 50 gal drs..lb. | ..... | .30 | ..... | .30 | .30 | .30 | .30 | .30 |
| Oxalate, drums works...lb. | .45 | .55 | .45 | .55 | .55 | .45 | .55 | .45 |
| Oxybutyrate, 50 gal drs wks.lb. | ..... | .30½ | ..... | .30½ | .30½ | .30½ | .36 | .30 |
| Ethylene Dibromide, 60 lb dr .lb. | ..... | .70 | ..... | .70 | .70 | .70 | .70 | .79 |
| Chlorhydrin, 40%, 10 gal cbys. chloro. cont...lb. | .75 | .85 | .75 | .85 | .85 | .75 | .85 | .75 |
| Dichloride, 50 gal drums...lb. | .05 | .07 | .05 | .07 | .07 | .05 | .10 | .05 |
| Glycol, 50 gal drs wks...lb. | .25 | .28 | .25 | .28 | .28 | .25 | 30 | .25 |
| Mono Butyl Ether drs wks. | ..... | .24 | .24 | .27 | .27 | .23 | .31 | .23 |
| Mono Ethyl Ether drs wks | .17 | .20 | .17 | .20 | .20 | .16 | .24 | .16 |
| Mono Ethyl Ether Acetate dr. wks... | .19½ | .23 | .19½ | .23 | .23 | .19 | .26 | .19 |
| Mono Methyl Ether, drs.lb. | .21 | .23 | .21 | .23 | .23 | .19 | .23 | .19 |
| Stearate... | .18 | .18 | .18 | .18 | ..... | ..... | ..... | ..... |
| Oxide, cyl...lb. | ..... | 2.00 | .... | 2.00 | 2.00 | 2.00 | | |
| Ethylidenaniline...lb. | .45 | .47½ | .45 | .47½ | .47½ | .45 | .65 | .45 |
| Feldspar, bulk...ton | 15.00 | 20.00 | 15.00 | 20.00 | 25.00 | 15.00 | 25.00 | 20.00 |
| Powdered, bulk works...ton | 15.00 | 21.00 | 15.00 | 21.00 | 21.00 | 15.00 | 21.00 | 15.00 |
| Ferric Chloride, tech, crystal 475 lb bbls...lb. | .05 | .07½ | .05 | .07½ | .07½ | .05 | .09 | .05 |
| Fish Scrap, dried, wks...unit | ..... | 2.00&10 | 2.00&10 | 4.25&10 | 4.35&10 | 3.90&10 | 4.25&10 | 3.65&10 |
| Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit | ..... | 2.40&50 | ..... | 2.40&50 | 3.50&50 | 3.20&50 | 4.00&50 | 3.50&50 |
| Fluorspar, 98%, bags... | 41.00 | 46.00 | 41.00 | 46.00 | 46.00 | 41.00 | 46.00 | 41.00 |
| **Formaldehyde** | | | | | | | | |
| Formaldehyde, aniline, 100 lb. | ..... | ..... | ..... | .... | ..... | ..... | ..... | ..... |
| drums...lb. | .37½ | .42 | .37½ | .42 | .42 | .37½ | .42 | .37 |
| USP, 400 lb bbls wks...lb. | .06 | .07¾ | .06 | .07¾ | .08 | .06 | .10 | .08½ |
| Fossil Flour...lb. | .02½ | .04 | .02½ | .04 | .04 | .02½ | .04 | .02½ |
| Fullers Earth, bulk, mines ..ton | 15.00 | 20.00 | 15.00 | 20.00 | 20.00 | 15.00 | 20.00 | 15.00½ |
| Imp. powd c-1 bags...ton | 24.00 | 30.00 | 24.00 | 30.00 | 30.00 | 24.00 | 30.00 | 25.00 |
| Furfural (tech.) drums, wks..lb. | ..... | .10 | ..... | .10 | .15 | .10 | .19½ | .17 |
| Furfuramide (tech) 100 lb dr..lb. | ..... | .30 | ..... | .30 | .30 | .30 | .30 | .30 |
| Furfuryl Acetate, 1 lb tins...lb. | ..... | 5.00 | ..... | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Alcohol, (tech) 100 lb dr...lb. | ..... | .50 | ..... | .50 | .50 | .50 | .50 | .50 |
| Furoic Acid (tech) 100 lb dr...lb. | ..... | .50 | ..... | .50 | .50 | .50 | 1.00 | .50 |
| Fusel Oil, 10% impurities ...gal. | .. .. | 1.35 | ..... | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
| Fustic, chips...lb. | .04 | .05 | .04 | .05 | .05 | .04 | .05 | .04 |
| Crystals, 100 lb boxes...lb. | .18 | .20 | .18 | .22 | .22 | .20 | .22 | .20 |
| Liquid, 50°, 600 lb bbls...lb. | .07 | .08 | .07 | .10 | .10 | .09 | .10 | .09 |
| Solid, 50 lb boxes...lb. | .14 | .16 | .14 | .16 | .16 | .14 | .16 | .14 |
| Sticks...ton | 25.00 | 26.00 | 25.00 | 26.00 | 26.00 | 25.00 | 26.00 | 25.00 |
| G Salt paste, 360 lb bbls...lb. | .45 | .50 | .45 | .50 | .50 | .45 | .52 | .45 |
| Gall Extract...lb. | .18 | .20 | .18 | .20 | .20 | .18 | .21 | .18 |
| Gambier, common 200 lb cs. .lb. | ..... | .07 | .06½ | .07 | .07 | .06 | .07 | 06 |
| 25% liquid, 450 lb bbls...lb. | 08 | 10 | .08 | .10 | .10 | .08 | .14 | .08 |
| Singapore cubes, 150 lb bg..lb. | .09½ | .09 | .09½ | .09 | .09 | .08½ | .09 | .08½ |
| Gelatin, tech, 100 lb cases...lb. | .45 | 50 | .45 | .50 | .50 | .45 | .50 | .45 |
| Glauber's Salt, tech, c-1 wks...100 lb. | 1.00 | 1.70 | 1.00 | 1.70 | 1.70 | 1.00 | 1.70 | .70 |
| Glucose (grape sugar) dry 70-80° bags c-1 NY...100 lb. | 3.24 | 3.34 | 3.24 | 3.34 | 3.34 | 3.24 | 3.34 | 3.20 |
| Tanner's Special, 100 lb bags ...100 lb. | ..... | 3.14 | ..... | 3.14 | 3.14 | 3.14 | 3.14 | 3.14 |
| Glue, medium white, bbls ...lb. | .16 | .20 | .16 | .24 | .24 | .20 | .24 | .20 |
| Pure white, bbls...lb. | .20 | .25 | .20 | .26 | .26 | .22 | .26 | .22 |
| Glycerin, CP, 550 lb drs...lb. | ..... | .11½ | .11½ | .14½ | .14½ | .12½ | .16 | .13½ |
| Dynamite, 100 lb drs... lb. | ..... | .09¾ | .09¾ | .12¼ | .12¼ | .11 | .12¼ | .10¾ |
| Saponification, tanks... lb. | ..... | .06¼ | .06½ | .07½ | .08 | .07½ | .08¾ | .07¾ |
| Soap Lye, tanks...lb. | ..... | .05½ | .05½ | .07 | .07½ | .06¾ | .07½ | .06¾ |
| Graphite, crude, 220 lb bgs...ton | 15.00 | 35.00 | 15.00 | 35.00 | 35.00 | 15.00 | 35.00 | 15.00 |
| Flake, 500 lb bbls...lb. | .06 | 09 | .06 | .09 | .09 | .06 | .09 | 06 |
| **Gums** | | | | | | | | |
| Gum Accroides, Red, coarse and fine 140-150 lb bags...lb. | .03¾ | .04½ | .03¾ | .04½ | .04½ | .03¾ | .04½ | .03 |
| Powd, 150 lb bags...lb. | .06 | .06½ | 06 | .06½ | .06½ | .06 | .06½ | .06¾ |

# *Prices Current and Comment*

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

**Cresol, U. S. P.** — Some improvement in demand was noted with the placing in effect of a 2c reduction.

**Dammar** — While published prices were unchanged during the month it was reported that 10¾c per lb. was being quoted for Singapore No. 1. Total exports of Singapore dammar from Singapore in the second quarter of the year were 1,777 tons, against 1,646 tons in the second quarter of 1930.

**Dextrin** — No price alterations have been made in this item for several months. Demand from the textile centers featured an otherwise dull and listless market.

**Egg Yolk** — The price structure appeared to be much strengthened on the news that material in the primary markets had been destroyed by flood.

**Fine Chemicals** — The month of October saw a slight improvement in seasonal items, but in general the market was quiet. Quinine was in better demand. Production of iodine, resublimed, in the United States in 1929 amounted to 103,922 pounds, valued at $463,152, as compared with 90,765 pounds, valued at $429,475 in 1927.

**Formaldehyde** — Little change was noted during the past month. Buyers were holding purchases to actual immediate needs awaiting announcement of 1932 prices.

**Glycerine** — Continued unseasonably cold weather during the greater part of the past month prevented normal sale of anti-freeze grade. Jobbers and repackers of glycerine and alcohol mixtures, however, were taking fair sized deliveries. Movement into other consuming channels has improved. Prices, however, were weak.

**Kauri Gum** — In sympathy with the other varnish gums this item passed through a very quiet period. Prices remained fairly firm in the face of the continued indifference from consumers. Both production and exports from primary centers show declines. From April to July, inclusive, 1931, receipts of gum at the Port of Auckland aggregated 1,210 metric tons, or a loss of 161 tons from the same period of 1930. Exports from New Zealand for the quarter under review showed a decided decline, amounting to 721 metric tons, for a value of $152,000. Total receipts for the corresponding quarter of 1930 were 1,244 metric tons, having a value of $305,000.

**Lead** — A decline of $5.00 a ton on pig lead brought about a reduction of litharge, orange mineral and dry red lead of ¼c. The metal price reached $3.75 at the close

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Yellow, 150-200 lb bags....lb. | 18 | .20 | .18 | .20 | .20 | .18 | .20 | .18 |
| Animi (Zanzibar) bean & pea 250 lb cases.............lb. | .35 | .40 | .35 | .40 | .40 | .35 | .40 | .35 |
| Glassy, 250 lb cases.......lb. | .50 | .55 | .50 | .55 | .55 | .50 | .55 | .50 |
| Asphaltum, Barbadoes (Manjak) 200 lb bags.............lb. | .04½ | .06 | .04½ | .12 | .12 | .09 | .12 | .09 |
| Egyptian, 200 lb cases.......lb. | .13 | .15 | .13 | .17 | .17 | .15 | .17 | .15 |
| Gilsonite Selects, 200 lb bags ........................ton | 30.50 | 32.90 | 30.50 | 32.90 | 32.90 | 30.50 | 32.90 | 30.50 |
| Damar Batavia standard 136, lb cases...................lb. | .09¾ | .10 | .09¾ | .13 | .20 | .14 | .26 | .22 |
| Batavia Dust, 160 lb bags.....lb. | .05 | .05½ | .05½ | .06 | .11 | .06 | .11 | .10½ |
| E Seeds, 136 lb cases.......lb. | .06 | .06½ | .07 | .08 | .13 | .08 | .17½ | .15 |
| F Splinters, 136 lb cases and bags..................lb. | .05½ | .06 | .06½ | .07½ | .13½ | .07 | .13½ | .13 |
| Singapore, No 1, 224 lb cases lb. | .12 | .12½ | .12 | .15 | .24 | .18½ | .30½ | .26 |
| No. 2, 224 lb cases........lb. | .07 | .07½ | .07 | .10 | .20½ | .13 | .24 | .21½ |
| No. 3, 180 lb bags.........lb. | .04½ | .05 | .05 | .06 | .11½ | .07 | .14 | .10 |
| Benzoin Sumatra, U. S. P. 120 lb cases...................lb. | .26 | .28 | .26 | .34 | .40 | .33 | .40 | .38 |
| Copal Congo, 112 lb bags, clean opaque................lb. | .16½ | .17 | .16 | .17 | .17 | .16 | .17 | .14 |
| Dark, amber.............lb. | .06 | .07 | .06½ | .07½ | .08 | .07¾ | .09 | .08¾ |
| Light, amber.............lb. | .12½ | .14 | .12½ | .14 | .14 | .12½ | .14 | .12½ |
| Water white.............lb. | .37 | .45 | .37 | .45 | .45 | .37 | .36 | .35 |
| Mastic.....................lb. | .46 | .47 | .46 | .58 | .65 | .57 | .65 | .58 |
| Manila, 180-190 lb baskets | | | | | | | | |
| Loba A..................lb. | .10 | .11 | .11 | .13 | .17½ | .13 | .17½ | .17 |
| Loba B..................lb. | .08 | .08½ | .09 | .10½ | .16½ | .13¼ | .16½ | .15½ |
| Loba C..................lb. | .07½ | .08 | .08½ | .10 | .14 | .10 | .14½ | .13½ |
| M A Sorts...............lb. | .04¾ | .05 | .04¾ | .06½ | ..... | ..... | ..... | ..... |
| D B B Chips.............lb. | .05½ | .06½ | .05¼ | .08 | ..... | ..... | ..... | ..... |
| East Indies chips, 180 lb bags lb. | .05 | .05½ | .05 | .05½ | .11 | .09 | .11 | .10 |
| Pale bold, 224 lb cs......lb. | .15½ | .16 | .15½ | .16 | .21 | .17½ | .21 | .20 |
| Pale nubs, 180 lb bags....lb, | .08 | .08½ | .08 | .09 | .16 | .12½ | .16 | 15 |
| Pontianak, 224 lb cases.... | | | | | | | | |
| Bold gen No 1.........lb. | .15½ | .16 | .16 | .17 | .21 | .19 | .23 | .20 |
| Gen chips spot.........lb. | .07 | .08 | .07 | .08½ | .15 | .13½ | .15 | .14½ |
| Elemi, No. 1, 80-85 lb cs...lb. | .09 | .09½ | .10 | .12 | .14 | .12½ | .14 | .13½ |
| No. 2, 80-85 lb cases.....lb. | .08½ | .09 | .09½ | .11½ | .13½ | .12 | .13½ | .13 |
| No. 3, 80-85 lb cases.....lb. | .08 | .08½ | .08½ | .11 | .13 | .11 | .13 | .12 |
| Kauri, 224-226 lb cases No. 1 ..................... | .43 | .46 | .42 | .50 | .57 | .48 | .57 | .50 |
| No. 2 fair pale..........lb. | .28 | .30 | .24 | .29 | .38 | .32 | .38 | .35 |
| Brown Chips, 224-226 lb cases.................lb. | .10 | .12 | .10 | .12 | .12 | .10 | .12 | .10 |
| Bush Chips, 224-226 lb. cases.................lb. | .26 | .28 | .28 | .34 | .40 | .38 | .40 | .38 |
| Pale Chips, 224-226 lb cases ......................lb. | .19 | 21 | .19 | .22 | .26 | .24½ | .26 | .24½ |
| Sandarac, prime quality, 200 lb bags & 300 lb casks...lb. | .18 | .19 | .18 | .22 | .40 | .27 | .72 | .35 |
| Helium, 1 lit. bot. ..........lit. | ..... | 25.00 | ..... | 25.00 | 25.00 | 25.00 | .20 | .17 |
| Hematine crystals, 400 lb bbls lb. | .14 | .18 | .14 | .18 | .18 | .14 | .20 | .14 |
| Paste, 500 bbls............lb. | ..... | .11 | ..... | .11 | .11 | .11 | .11 | .11 |
| Hemlock 25%, 600 lb bbls wks lb. | .03 | .03½ | .03 | .03½ | .03½ | .03 | .03¾ | .03 |
| Bark....................ton | ..... | 16.00 | ..... | 16.00 | 16.00 | 16.00 | 17.00 | 16.00 |
| Hexalene, 50 gal drs wks......lb. | .40 | .50 | .40 | .60 | .60 | .60 | .60 | .60 |
| Hexamethylenetetramine, drs.lb. | .46 | .47 | .46 | .50 | .50 | .46 | .58 | .48 |
| Hoof Meal, fob Chicago....unit | ..... | 1.35 | 1.35 | 2.50 | 3.75 | 2.50 | 4.00 | 3.75 |
| South Amer. to arrive....unit | ..... | 1.80 | 1.80 | 2.70 | 3.75 | 2.70 | 3.90 | 3.75 |
| Hydrogen Peroxide, 100 vol, 140 lb cbys..................lb. | .21 | .24 | .21 | .24 | .26 | .21 | .26 | .24 |
| Hydroxyamine Hydrochloride lb. | ..... | 3.15 | ..... | 3.15 | 3.15 | 3.15 | | |
| Hypernic, 51°, 600 lb bbls....lb. | .11 | .12 | .11 | .15 | .15 | .12 | .15 | .12 |
| Indigo Madras, bbls.........lb. | 1.25 | 1.30 | 1.25 | 1.30 | 1.30 | 1.28 | 1.30 | 1.28 |
| 20% paste, drums.........lb. | .15 | .18 | .15 | .18 | .18 | .15 | .18 | .15 |
| Synthetic, liquid..........lb. | ..... | .12 | ..... | .12 | .12 | .12 | .12 | .12 |
| Iron Chloride, see Ferric or Ferrous | | | | | | | | |
| Iron Nitrate, kegs...........lb. | .09 | .10 | .09 | .10 | .10 | .09 | .10 | .09 |
| Coml, bbls..........100 lb. | 2.50 | 3.25 | 2.50 | 3.25 | 3.25 | 2.50 | 3.25 | 2.50 |
| Oxide, English..........lb. | .10 | .12 | .10 | .12 | .12 | 10 | .12 | .10 |
| Red, Spanish...........lb. | .02½ | .03½ | .02½ | .03½ | .03½ | .02½ | .03½ | .02¼ |
| Isopropyl Acetate, 50 gal drs gal. | .85 | .90 | .85 | .90 | .90 | .85 | .90 | .85 |
| Japan Wax, 224 lb cases......lb. | .07¾ | .08 | .07¾ | .11 | .15½ | .11½ | .18 | .16 |
| Kieselguhr, 95 lb bgs NY....... Brown...............ton | 60.00 | 70.00 | 60.00 | 70.00 | 70.00 | 60.00 | 70.00 | 60.00 |
| Lead Acetate, bbls wks...100 lb. | 9.50 | 10.00 | 9.50 | 11.00 | 13.50 | 10.50 | 13.50 | 13.00 |
| White crystals, 500 lb bbls wks...............100 lb. | 10.50 | 11.00 | 10.50 | 12.25 | 14.50 | 11.50 | 14.50 | 14.00 |
| Arsenate, drs 1c-1 wks.....lb. | .10 | .13 | .10 | .14 | .16 | .13 | .15 | .13 |
| Dithiofuroate, 100 lb dr....lb. | ..... | 1.00 | ..... | 1.00 | 1.00 | 1.00 | | |
| Metal, c-1 NY........100 lb. | ..... | 3.75 | 3.75 | 4.60 | 7.75 | 5.10 | 7.75 | 6.10 |
| Nitrate, 500 lb bbls wks....lb. | .12 | .14 | .12 | .14 | .14 | .13 | .14 | .14 |
| Oleate, bbls..............lb. | .17½ | .18 | .17½ | .18 | .18 | .17½ | .18 | .17½ |
| Oxide Litharge, 500 lb bbls.lb. | .06½ | .07 | .06½ | .08 | .08¾ | .08½ | .08¾ | .08½ |
| Red, 500 lb bbls wks....lb. | .07½ | .08½ | .07½ | .08½ | .09¾ | .08¾ | .09¾ | .09½ |
| White, 500 lb bbls wks...lb. | .07½ | .08 | .07½ | .08 | .09½ | .07½ | .09½ | .09 |
| Sulfate, 500 lb bbls wk...lb. | .06¾ | .07 | .06¾ | .07 | .08¾ | .06¾ | .08¾ | .08½ |
| Leuna saltpetre, bags c.i.f. ..ton | ..... | Nom. | ..... | 57.60 | 57.60 | 57.60 | 57.00 | 52.00 |
| S. points c. i. f...........ton | ..... | Nom. | ..... | 57.90 | 57.90 | 57.90 | 57.30 | 52.30 |
| Lime, ground stone bags.....ton | ..... | 4.50 | ..... | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| Live, 325 lb bbls wks...100 lb. | ..... | 1.05 | ..... | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 |
| Lime Salts, see Calcium Salts | | | | | | | | |
| Lime-Sulfur soln bbls........gal. | .15 | .17 | .15 | .17 | .17 | .15 | .17 | .15 |
| Lithopone, 400 lb bbls 1c-1 wks ......................lb. | .04¾ | .05 | .04¾ | .05 | .05¾ | .04¾ | .06½ | .05¾ |
| Logwood, 51°, 600 lb bbls.....lb. | .07 | .08 | .07 | .08 | .08½ | .07 | .08½ | .08½ |
| Chips, 150 lb bags.........lb. | .03 | .03½ | .03 | .03½ | .03½ | .03 | .03½ | .03 |
| Solid, 50 lb boxes.........lb. | .12 | .12½ | .12 | .12½ | .12½ | .12½ | .12½ | .12½ |
| Sticks....................ton | 24.00 | 26.00 | 24.00 | 26.00 | 26.00 | 24.00 | 26.00 | 24.00 |
| Lower grades.............lb. | .07½ | .08 | .07½ | .08 | .08 | .07½ | .08 | .07½ |
| Madder, Dutch.............lb. | .22 | .25 | .22 | .25 | .25 | .22 | .25 | .22 |
| Magnesite, calc, 500 lb bbl...ton | 50.00 | 60.00 | 50.00 | 60.00 | 60.00 | 50.00 | 60.00 | 50.00 |

# Prices Current and Comment

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

of the month. World production of refined lead in September was 109,629 short tons, lowest in many years, comparing with 121,010 in August, and 148,506 in September, 1930, according to American Bureau of Metal Statistics. Daily average of output in September was 3,654 tons, also the lowest in many years, compared with 3,904 in August, and 4,950 tons in September, 1930.

**Mercury** — The very bearish condition of the mercury market reflected itself in further sharp revisions downward in the price. Consumption continued to hold at very restricted levels and the competitive position between foreign and domestic material seemed likely to remain unchanged for some time.

**Methanol** — With the approach of cold weather an increase in demand was reported for the synthetic grade. Natural material moved in very restricted quantities. The total production of refined methanol for the first eight months of this year is considerably below the output a year ago. The production in August amounted to 77,553 gallons, as compared with 91,696 gallons in July, and 374,521 gallons in August, 1930. Stocks on hand at the end of August were 342,124 gallons, compared with 395,322 gallons in July and 382,815 gallons on hand at the end of August, 1930.

**Solvent Naphtha** — No addition to the September increase was made last month, but stocks remained small and the price structure decidedly firm.

**Natural Dyestuffs** — The market for these items passed through another very quiet period. Spot sales were in fair volume, but consumers were limiting purchasing to small replacement lots.

**Nitre Cake** — Very limited stocks helped to maintain this item in a very firm position, prices generally being quoted on a $14 a ton basis.

**Caustic Potash** — Demand still continued to reflect the hand-to-mouth attitude of buyers. Prices were firm and unchanged and it is thought that no alteration in the schedule will be made.

**Petroleum Gases** — Movement in practically all members of this group was very satisfactory with the demand for propane specially heavy. Prices were firm and unchanged.

**Potash** — The potash salts were in very poor demand during the entire month. The price structure remains firm.

**Phosphate Rock** — The news of greatest importance was the suggestion by the I. C. C. that they would permit an increase of $6 a car providing the roads accepted

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| **Magnesium** | | | | | | | | |
| Magnesium Carb, tech, 70 lb bags NY....lb. | .06 | .06½ | .06 | .06½ | .06½ | .06 | .06½ | .06 |
| Chloride flake, 375 lb. drs c-l wks....ton | 35.00 | 36.00 | 35.00 | 36.00 | 36.00 | 36.00 | 36.00 | 36.00 |
| Imported shipment....ton | 31.75 | 33.00 | 31.75 | 33.00 | 33.00 | 31.75 | 33.00 | 33.00 |
| Fused, imp, 900 lb bbls NY ton | ..... | 31.00 | ..... | 31.00 | 31.00 | 31.00 | 31.00 | 31.00 |
| Fluosilicate, crys, 400 lb bbls wks....lb. | .10 | .10½ | .10 | .10½ | .10½ | .10 | .10½ | .10 |
| Oxide, USP, light, 100 lb bbls....lb. | ..... | .42 | ..... | .42 | .42 | .42 | .42 | .42 |
| Heavy, 250 lb bbls....lb. | ..... | .50 | ..... | .50 | .50 | .50 | .50 | .50 |
| Peroxide, 100 lb cs....lb. | 1.00 | 1.25 | 1.00 | 1.25 | 1.25 | 1.00 | 1.25 | 1.00 |
| Silicofluoride, bbls....lb. | .09¾ | .10½ | .09¾ | .10½ | .10½ | .09¾ | .10½ | .09¾ |
| Stearate, bbls....lb. | .24 | .26 | .24 | .26 | .26 | .25 | .26 | .25 |
| Manganese Borate, 30%, 200 lb bbls....lb. | ..... | .19 | ..... | .19 | .19 | .19 | .24 | .19 |
| Chloride, 600 lb casks....lb. | .07½ | .08½ | .07½ | .08½ | .08½ | .07½ | .08½ | .08 |
| Dioxide, tech (peroxide) drs lb. | .03½ | .06 | .03½ | .06 | .06 | .03½ | .06 | .04½ |
| Ore, Powdered or granular.. 75-80%, bbls....lb. | .02½ | .03 | .02½ | .03 | .03 | .02½ | .03½ | .02½ |
| 80-85%, bbls....lb. | ..... | .03½ | ..... | .03½ | .03½ | .03½ | .04½ | .03½ |
| 85-88%, bbls....lb. | .04 | .04½ | .04 | .04½ | .04½ | .04 | .05½ | .04 |
| Sulfate, 550 lb drs NY....lb. | .07 | .08 | .07 | .08 | .08 | .07 | .08½ | .07 |
| Mangrove 55%, 400 lb bbls...lb. | ..... | .04 | .03½ | .04 | Nom. | .03½ | Nom. | .03½ |
| Bark, African....ton | ..... | 24.00 | 23.00 | 29.75 | 33.00 | 29.75 | 35.00 | 30.00 |
| Marble Flour, bulk....ton | 14.00 | 15.00 | 14.00 | 15.00 | 15.00 | 14.00 | 15.00 | 14.00 |
| Mercurous chloride....lb. | ..... | 1.15 | 1.15 | 2.05 | 2.05 | 2.05 | 2.05 | 2.05 |
| Mercury metal....76 lb flask | 72.00 | 74.00 | 72.00 | 106.00 | 124.50 | 106.00 | 126.00 | 120.00 |
| Meta-nitro-aniline....lb. | .67 | .69 | .67 | .69 | .69 | .67 | .74 | .67 |
| Meta-nitro-para-toluidine 200 lb. bbls....lb. | 1.40 | 1.55 | 1.40 | 1.55 | 1.55 | 1.50 | 1.55 | 1.50 |
| Meta-phenylene-diamine 300 lb. bbls....lb. | .80 | .84 | .80 | .84 | .84 | .80 | .90 | .80 |
| Meta-toluene-diamine, 300 lb bbls....lb. | .67 | .69 | .67 | .69 | 69 | .67 | .72 | .67 |
| **Methanol** | | | | | | | | |
| Methanol, (Wood Alcohol),.... 95%....gal. | .33 | .35 | .33 | .37 | .48 | .35 | .65 | .51 |
| 97%....gal. | .34 | .39 | .34 | .43 | .49 | .39 | .65 | .53 |
| Pure, Synthetic drums cars gal. | .39½ | .41½ | .39½ | .42½ | .50 | .42½ | .68 | .53 |
| Synthetic tanks....gal. | ..... | .35½ | .35½ | .40½ | .50 | .40½ | .66 | .54 |
| Methyl Acetate, drums....gal. | .. .. | Nom. | ..... | Nom. | Nom. | Nom. | .95 | .95 |
| Acetone,....gal. | .50 | .55 | 50 | .70 | .77 | .65 | .85 | .73 |
| Anthraquinone,....lb. | .85 | .95 | .85 | .95 | .85 | .70 | .95 | .85 |
| Cellosolve, (See Ethylene Glycol Mono Methyl Ether) | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .... |
| Chloride, 90 lb cyl....lb. | .45 | .45 | .45 | .45 | .45 | .45 | .60 | .45 |
| Furoate, tech., 50 gal. dr., .lb. | ..... | .50 | ..... | .50 | .50 | .50 | .50 | .50 |
| Mica, dry grd. bags wks....lb. | 65.00 | 80.00 | 65.00 | 80.00 | 80.00 | 65.00 | 80.00 | 65.00 |
| Wet, ground, bags wks....lb. | 110.00 | 115.00 | 110.00 | 115.00 | 115.00 | 110.00 | 115.00 | 110.00 |
| Michler's Ketone, kegs....lb. | ..... | 3.00 | ..... | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Monochlorobenzene, drums see, Chorobenzene, mono....lb. | | | | | | | | |
| Monomethylparaminosufate 100 lb drums....lb. | 3.75 | 4.00 | 3.75 | 4.00 | 4.00 | 3.75 | 4.20 | 3.75 |
| Montan Wax, crude, bags....lb. | .05½ | .07 | .05½ | .07 | .07 | .06 | .07 | .06½ |
| Myrobalans 25%, liq bbls....b | .03¾ | .04½ | .03¾ | .04½ | .04½ | .03¾ | .04½ | .03¾ |
| 50% Solid, 50 lb boxes....lb. | .05 | .05½ | .05 | .05½ | .05½ | .05 | .08½ | .05 |
| J1 bags....ton | 34.00 | 35.00 | 34.00 | 35.00 | 41.00 | 34.00 | 43.00 | 40.00 |
| J 2 bags....ton | ..... | 16.50 | 15.50 | 22.50 | 26.50 | 19.75 | 40.00 | 26.50 |
| R 2 bags....ton | ..... | 17.00 | 16.00 | 20.00 | 27.50 | 19.00 | 34.00 | 27.50 |
| Naphtha, v. m. & p. (deodorized) bbls....gal. | .14 | .16 | .14 | .18 | .16 | .16 | .18 | .16 |
| Naphthalene balls, 250 lb bbls wks....lb. | .03¾ | .04¾ | .03¾ | .04¾ | .05½ | .03¾ | .05½ | .05½ |
| Crushed, chipped bgs wks..lb. | ..... | .04 | ..... | .04 | .04½ | .04 | .04½ | .04½ |
| Flakes, 175 lb bbls wks....lb. | ..... | .03¾ | ..... | .03¾ | .05 | .03¾ | .05 | .05 |
| Nickel Chloride, bbls kegs....lb. | .18 | .20 | .18 | .21 | .21 | .20 | .24 | .20 |
| Oxide, 100 lb kegs NY....lb. | .37 | .40 | .37 | .40 | .40 | .37 | .40 | .37 |
| Salt bbl. 400 bbls lb NY...lb. | .10½ | .13 | .10½ | .13 | .13 | .10½ | .13 | .13 |
| Single, 400 lb bbls NY....lb. | .10½ | .12 | .10½ | .12 | .13 | .10½ | .13 | .13 |
| Metal ingot....lb. | .35 | .35 | .35 | ..... | ..... | ..... | ..... | ..... |
| Nicotine, free 40%, 8 lb tins, cases....lb. | 1.25 | 1.30 | 1.25 | 1.30 | 1.30 | 1.25 | 1.30 | 1.25 |
| Sulfate, 10 lb tins....lb. | .98½ | 1.20 | .98½ | 1.20 | 1.20 | .98½ | 1.20 | .98½ |
| Nitre Cake, bulk....ton | 12.00 | 14.00 | 12.00 | 14.00 | 18.00 | 12.00 | 18.00 | 12.00 |
| Nitrobenzene, redistilled, 1000 lb drs wks....lb. | .09 | .09½ | .09 | .09½ | .09½ | .09 | .10½ | .09 |
| Nitrocellulose, c-l-l-cl, wks...lb. | .25 | .36 | .25 | .36 | .36 | .25 | .36 | .25 |
| Nitrogenous Material, bulk..unit | 1.60 | 1.65 | 1.60 | 2.70 | 3.40 | 2.50 | 4.00 | 3.40 |
| Nitronaphthalene, 550 lb bbls.lb. | ..... | .25 | ..... | .25 | .25 | .25 | .25 | .25 |
| Nitrotoluene, 1000 lb drs wks.lb. | .14 | .15 | .14 | .15 | .15 | .14 | .15 | .14 |
| Nutgalls Aleppy, bags....lb. | ..... | .18 | .16 | .18 | .16½ | .16 | .16½ | .16 |
| Chinese, bags....lb. | .17 | .18 | .17 | .18 | .13 | .12 | .13 | .12 |
| Oak Bark, ground....ton | 30.00 | 35.00 | 30.00 | 35.00 | 35.00 | 30.00 | 50.00 | 30.00 |
| Whole....ton | 20.00 | 23.00 | 20.00 | 23.00 | 23.00 | 20.00 | 23.00 | 20.00 |
| Orange-Mineral, 1100 lb casks NY....lb. | .10½ | .13 | .10½ | .13 | .13 | .11¾ | .13½ | .11¾ |
| Orthoaminophenol, 50 lb kgs..lb. | 2.15 | 2.25 | 2.15 | 2.25 | 2.25 | 2.15 | 2.25 | 2.15 |
| Orthoanisidine, 100 lb drs....lb. | 2.50 | 2.60 | 2.50 | 2.60 | 2.60 | 2.50 | 2.60 | 2.50 |
| Orthochlorophenol, drums....lb. | .50 | .65 | .50 | .65 | .65 | .50 | .65 | .50 |
| Orthocresol, drums....lb. | .18 | .22 | .18 | .25 | .35 | .18 | .28 | .18 |
| Orthodichlorobenzene, 1000 lb drums....lb. | .07 | .10 | .07 | .10 | .10 | .07 | .10 | .07 |
| Orthonitrochlorobenzene, 1200 lb drs wks....lb. | .28 | .29 | .28 | .33 | .33 | .30 | .33 | .30 |
| Orthonitrotoluene, 1000 lb drs wk....lb. | .16 | .18 | .16 | .18 | .18 | .16 | .18 | .16 |
| Orthonitrophenol, 350 lb dr...lb. | .85 | .90 | .85 | .90 | .90 | .85 | .90 | .85 |
| Orthotoluidine, 350 lb bbl lc-l lb. | .28 | 30 | .25 | .30 | .30 | .25 | .30 | .25 |

# Prices Current and Comment

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

other provisions notably that the increases be given first to the poorer roads. For an analysis of the international phosphate rock situation see article by Joseph Kalish page 461, this issue. Total exports of Tunisian phosphate rock for the first seven months of 1931 were 1,127,000 metric tons with production placed at 1,368,000 tons as compared with 1,678,000 for exports and 1,826,000 for production in the corresponding period of 1930. Mine operators are pessimistic as to the possibility of reducing accumulated stocks at the mines. The Algerian Department of Mines reports that since the beginning of the year the Algerian production of phosphates has been 325,158 metric tons. The labor supply is still abundant and normally should remain so through the winter. The local market for fertilizers is reported slightly more active with the approach of the planting season. The Cie des Phosphates de Constantine the only company in operation, is said to be making good progress with the preliminary works for opening its new mine at Djebel Onk near the Tunisian frontier. By the terms of the lease with the government the annual output from this mine in full operation is to be a million tons of phosphate rock. Recent statistics on Moroccan production and exports are not available but it is understood that 1931 deliveries have shown a sharp decline as compared with early 1930 and that stocks at the mine are heavy.

**Rosin** — Price changes were mixed but generally speaking the naval stores industry joined in the general rise in the commodity markets. According to statistics furnished by the Department of Commerce, the total exports of naval stores during September amounted to $1,103,641, as against $1,538,021 a year ago. Gum rosin shipments of 75,373 barrels worth $484,850, compared with 80,846 barrels valued at $764,387; turpentine exports of 1,284,446 gallons worth $435,373, with 1,069,861 valued at $445,129. Wood rosin exports were well under September, 1930, totalling 11,517 barrels, against 14,436, valued at $74,946 and $163,965. Wood turpentine shipments were also sharply lower, 53,291 gallons, against 97,541, worth $19,739 and $45,576. Other gums and rosins declined from $109,888 to $79,178. For the nine months ended September 30 the total shipments of all naval stores amounted to $11,195,255, as against $17,919,777 in 1930. Gum rosin exports fell to 678,698 barrels from 820,723, with respective values of $5,533,458 and $9,634,690. Turpentine dropped to 8,825,278 gallons from 10,758,820, valued

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Orthonitroparachlorphenol, tins ....lb. | .70 | .75 | .70 | .75 | .75 | .70 | .75 | .70 |
| Osage Orange, crystals ....lb. | .16 | .17 | .16 | .17 | .17 | .16 | .17 | .16 |
| 51 deg. liquid ....lb. | .07 | .07½ | .07 | .07½ | .07½ | .07 | .07½ | .07 |
| Powdered, 100 lb bags ....lb. | .14½ | .15 | .14½ | .15 | .15 | .14½ | .15 | .14½ |
| Paraffin, refd, 200 lb cs slabs | | | | | | | | |
| 123-127 deg. M. P. ....lb. | ..... | .03 | .03¼ | .03 | .04¾ | .03½ | .06¾ | .04¾ |
| 128-132 deg. M. P. ....lb. | ..... | .03¾ | .03¼ | .03¾ | .06¾ | .03¾ | .07 | .04¾ |
| 133-137 deg. M. P. ....lb | ..... | .04¾ | .04¾ | .04¾ | .07½ | .04¾ | .07¾ | .06¾ |
| Para Aldehyde, 110-55 gal drs..lb. | .20½ | .23 | .20½ | .23 | .23 | .20½ | .28 | .20½ |
| Aminoacetanilid, 100 lb bg..lb | .52 | .60 | .52 | .60 | 1.05 | .52 | 1.05 | 1.00 |
| Aminohydrochloride, 100 lb kegs ....lb | 1.25 | 1.30 | 1.25 | 1.30 | 1.30 | 1.25 | 1.30 | 1.25 |
| Aminophenol, 100 lb keg...lb. | .82 | .84 | .82 | .86 | 1.02 | .92 | 1.15 | .99 |
| Chlorophenol, drums ....lb. | .50 | .65 | .50 | .65 | .65 | .50 | .65 | .50 |
| Coumarone, 330 lb drums. lb. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cymene, refd, 110 gal dr..gal. | 2.25 | 2.50 | 2.25 | 2.50 | 2.50 | 2.25 | 2.50 | 2.25 |
| Dichlorobenzene, 150 lb bbls wks ....lb. | .15½ | .16 | .15½ | .20 | .20 | .17 | .20 | .17 |
| Nitroacetanilid, 300 lb bbls.lb. | .45 | .52 | .45 | .55 | .55 | .50 | .55 | .50 |
| Nitroaniline, 300 lb bbls wks ....lb. | .48 | .55 | .48 | .55 | .55 | .48 | .55 | .48 |
| Nitrochlorobenzene, 1200 lb drs wks ....lb. | .23 | 26 | .23 | .26 | .26 | .23 | .26 | 23 |
| Nitro-orthotoluidine, 300 lb bbls ....lb. | 2.75 | 2.85 | 2.75 | 2.85 | 2.85 | 2.75 | 2.85 | 2.75 |
| Nitrophenol 185 lb bbls ....lb. | .45 | 50 | .45 | .50 | .50 | .45 | .55 | .45 |
| Nitrosodimethylaniline, 120 lb. bbls ....lb. | .92 | .94 | .92 | .94 | .94 | .92 | .94 | .92 |
| Nitrotoluene, 350 lb bbls ....lb. | .29 | .31 | .29 | .31 | .31 | .29 | .31 | .29 |
| Phenylenediamine, 350 lb bbls ....lb. | 1.15 | 1.20 | 1.15 | 1.20 | 1.20 | 1.15 | 1.20 | 1.15 |
| Tolueneulfonamide, 175 lb bbls ....lb. | .70 | .75 | .70 | .75 | 75 | .70 | .75 | .70 |
| Toluenesulfonchloride, 410 lb bbls wks ....lb. | .20 | .22 | .20 | .22 | .22 | .20 | .22 | .20 |
| Toluidine, 350 lb bbls wk...lb. | .42 | .43 | .40 | .44 | .40 | .38 | .42 | .38 |
| Paris Green, Arsenic Basis | | | | | | | | |
| 100 lb kegs ....lb. | ..... | .27 | ..... | .27 | .27 | .27 | .27 | 25 |
| 250 lb kegs ....lb. | ..... | .26 | .25 | .26 | .25 | .25 | .25 | .23 |
| Persian Berry Ext., bbls ....lb. | .25 | Nom. | .25 | Nom. | Nom. | .25 | 25 | .25 |
| Pentasol (see Alcohol, Amyl)... | | | | | | | | |
| Pentasol Acetate (see Amyl Acetate) .... | | | | | | | | |
| Petrolatum, Green, 300 lb bbl.lb. | .02 | .02½ | .02 | .02½ | .02½ | .02 | .02½ | .02 |
| Phenol, 250-100 lb drums ....lb. | .14½ | .15 | .14½ | .15 | .15 | .14½ | .16 | 13 |
| Phenyl-Alpha-Naphthylamine, 100 lb kegs ....lb. | ..... | 1.35 | ..... | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
| Phenylhydrazine Hydrochloride ....lb. | 2.90 | 3.00 | 2.90 | 3.00 | 3.00 | 2.90 | | |

### Phosphate

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Phosphate Acid (see Superphosphate) | | | | | | | | |
| Phosphate Rock, f.o.b. mines | | | | | | | | |
| Florida Pebble, 68% basis..ton | 3.10 | 3.25 | 3.10 | 3.25 | 3.15 | 3.00 | 3.15 | 3.00 |
| 70% basis ....ton | 3.75 | 3.90 | 3.75 | 3.90 | 4.00 | 3.75 | 4.00 | 3.50 |
| 72% basis ....ton | 4.25 | 4.35 | 4.25 | 4.35 | 4.50 | 4.25 | 4.50 | 4.00 |
| 75-74% basis ....ton | 5.25 | 5.50 | 5.25 | 5.50 | 5.50 | 5.25 | 5.50 | 5.00 |
| 75% basis ....ton | ..... | 5.75 | ..... | 5.75 | 5.75 | 5.75 | 5.75 | 5.75 |
| 77-80% basis ....ton | ..... | 6.25 | ..... | 6.25 | 6.25 | 6.25 | 6.25 | 6.25 |
| Tennessee, 72% basis ....ton | ..... | 5.00 | ..... | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Phosphorous Oxychloride 175 lb cyl ....lb. | .18 | .20 | .18 | .20 | .25 | .18 | .40 | .20 |
| Red, 110 lb cases ....lb. | .43 | .46 | .42 | .46 | .42 | .37½ | .60 | .37½ |
| Yellow, 110 lb cases wks..lb. | .31 | .37½ | .31 | .37½ | .37½ | .31 | .32 | .31 |
| Sesquisulfide, 100 lb cs ....lb. | .38 | .44 | .38 | .44 | .44 | .44 | .46 | .44 |
| Trichloride, cylinders ....lb. | .18 | .20 | .18 | .20 | .25 | .18 | .35 | .20 |
| Phthalic Anhydride, 100 lb bbls wks ....lb. | .15 | .16 | .15 | .16 | .20 | .15 | .20 | .18 |
| Pigments Metallic, Red or brown bags, bbls, Pa. wks ....ton | 37.00 | 45.00 | 37.00 | 45.00 | 45.00 | 37.00 | 45.00 | 37.00 |
| Pine Oil, 55 gal drums or bbls | | | | | | | | |
| Destructive dist ....lb. | .61 | .63 | .61 | .64 | .64 | .63 | .64 | .63 |
| Prime bbls ....bbl. | 8.00 | 10.60 | 8.00 | 10.60 | 10.60 | 8.00 | 10.60 | 8.00 |
| Steam dist. bbls ....gal. | .54 | .61 | .54 | .70 | .70 | .65 | .70 | .65 |
| Pitch Hardwood, wks ....ton | 35.00 | 45.00 | 35.00 | 45.00 | 45.00 | 35.00 | 45.00 | 40.00 |
| Plaster Paris, tech, 250 lb bbls ....bbl. | 3.30 | 3.50 | 3.30 | 3.50 | 3.50 | 3.30 | 3.50 | 3.30 |
| Platinum, Refined ....oz. | ..... | 38.00 | 38.00 | 38.00 | .... | ..... | ..... | ..... |

### Potash

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Potash, Caustic, wks, solid...lb. | .06½ | .06¾ | .06½ | .06¾ | .06¾ | .06½ | .07½ | .06½ |
| flake ....lb. | .0705 | 08 | .0705 | .08 | .08 | .0705 | .07½ | .0705 |
| Potash Salts, Rough Kainit | | | | | | | | |
| 12.4% basis bulk ....ton | ..... | 9.20 | ..... | 9.20 | 9.20 | 9.10 | 9.10 | 9.00 |
| 14% basis ....ton | ..... | 9.70 | ..... | 9.70 | 9.70 | 9.60 | 9.60 | 9.50 |
| Manure Salts .... | | | | | | | | |
| 20% basis bulk ....ton | ..... | 12.65 | ..... | 12.65 | 12.65 | 12.50 | 12.50 | 12.40 |
| 30% basis bulk ....ton | ..... | 19.15 | ..... | 19.15 | 19.15 | 18.95 | 18.95 | 18.75 |
| Potassium Acetate ....lb. | .27 | .28 | .27 | .30 | .30 | .27 | | |
| Potassium Muriate, 80% basis bags ....ton | ..... | 37.15 | ..... | 37.15 | 37.15 | 36.75 | 36.75 | 36.40 |
| Pot. & Mag. Sulfate, 48% basis bags ....ton | ..... | 27.80 | ..... | 27.80 | 27.80 | 27.50 | 27.50 | 27.00 |
| Potassium Sulfate, 90% basis bags ....ton | ..... | 48.25 | .... | 48.25 | 48.25 | 47.75 | 47.75 | 47.30 |
| Potassium Bicarbonate, USP, 320 lb bbls ....lb. | .07¾ | .09 | .07¾ | .10 | .10 | .09½ | .14 | .09½ |
| Bichromate Crystals, 725 lb casks ....lb. | .08½ | .09 | 08½ | .09 | .09½ | .08¾ | .09½ | .09 |
| Powd., 725 lb cks wks ....lb. | .13 | .13½ | .13 | .13 | .13½ | .13 | .13½ | .13 |

# *Prices Current and Comment*

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

at $3,613,184 and $4,958,313. The value of wood rosin shipments was down to $906,535, as compared with $1,798,879, and of wood turpentine down to $255,321 from $346,124. Other gums and rosins showed a value of $811,409, against $1,073,596 the preceding year.

**Soda Ash** — Tonnages moved during October were generally below the figure for September despite the fact that normally the reverse is usually true. Producers announced during the month their intention to repeat 1931 prices for l. cl. lots. It is thought that the announcement for carlots will be withheld until about the fifteenth of November. Indications point to a renewal of large tonnages at the prices prevailing on existing contracts but that for smaller tonnages some increase may be asked. There is no indication of anything like a repetition of the disastrous conditions existing at this time a year ago.

**Caustic Soda** — As in the case of ash buyers were restricting purchases in anticipation of word on 1932 contract prices. Less-carlot delivered prices were renewed at current levels in the Metropolitan District. The exports of sodium compounds from the United States for the first eight months of 1931 show some encouraging signs and the total value of $6,982,000 is only 5 per cent less than the first eight months of 1930. Borax shipments of $2,278,000 were made at a somewhat higher unit value than during the corresponding period of last year although the quantity of 56,800 tons was somewhat less. Caustic soda, however, advanced six per cent in quantity to 46,979 pounds, while the value declined two per cent to $2,531,000.

**Shellac** — Movement in the shellac markets locally was within very narrow limits and prices were substantially the same at the close of the month. In the primary markets a similar condition prevailed. Actual tonnages moving either here or abroad were comparatively small with buyers and consumers unwilling to make any concessions for forward commitments. An important report on the administration of the Forest Department of the Government of Bihar and Orissa for the year 1929-30 describes the experimental work being done in regard to the cultivation of lac. The Department plans to establish demonstration areas for the application and educational use of research work done at the Lac Research Institute at Ranchi. Seven of these demonstration areas, covering an area of 690 acres, have been established in various districts of the

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Binoxalate, 300 lb bbls.....lb. | .14 | .17 | .14 | .17 | .17 | .14 | .17 | .14 |
| Bisulfate, 100 lb kegs......lb. | .16 | .30 | .16 | .30 | .30 | .30 | .30 | .30 |
| Carbonate, 80-85% calc. 800 lb casks..............lb. | .06⅝ | .07⅛ | .06⅝ | .07⅛ | .05¾ | .05⅛ | .05¾ | .05⅛ |
| Chlorate crystals, powder 112 lb keg wks...........lb. | .08 | .08½ | .08 | .08½ | .09 | .08 | .09 | .08½ |
| Chloride, crys bbls.........lb. | .04 | .04¾ | .04 | .06 | .06 | .05½ | .05½ | .05½ |
| Chromate, kegs...........lb. | .23 | .28 | .23 | .28 | .28 | .23 | .28 | .23 |
| Cyanide, 110 lb. cases.....lb. | .55 | .57½ | .55 | .57½ | .57½ | .55 | .57½ | .55 |
| Metabisulfite, 300 lb. bbl...lb. | .11 | .13 | .11 | .13 | .13 | .12 | .13 | .11 |
| Oxalate, bbls.............lb. | .20 | .24 | .20 | .24 | .24 | .20 | .24 | .16 |
| Perchlorate, casks wks.....lb. | .09 | .11 | .09 | .12 | .12 | .11 | .12 | .11 |
| Permanganate, USP, crys 500 & 100 lb drs wks........lb. | .16 | .16½ | .16 | .16½ | .16½ | .16 | .16½ | .16 |
| Prussiate, red, 112 lb keg...lb. | .35 | .37 | .35 | .40 | .40 | .38 | .40 | .38 |
| Yellow, 500 lb casks.....lb. | .18½ | .21 | .18½ | .21 | .21 | .18½ | .21 | .18½ |
| Tartrate Neut, 100 lb keg..lb. | ..... | .21 | ..... | .21 | .21 | .21 | .51 | .51 |
| Titanium Oxalate, 200 lb bbls ..........................lb. | .21 | .23 | .21 | .23 | .23 | .21 | .25 | .21 |
| Propyl Furoate, 1 lb tins.....lb. | ..... | 5.00 | ..... | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Pumice Stone, lump bags.....lb. | .04 | .05 | .04 | .05 | .05 | .04 | .05 | .04 |
| 250 lb bbls.............lb. | .04½ | .06 | .04½ | .06 | .06 | .04½ | .06 | .04½ |
| Powdered, 350 lb bags.....lb. | .02½ | .03 | .02½ | .03 | .03 | 02½ | .03 | .02½ |
| Putty, commercial, tubs..100 lb. | 2.35 | 2.45 | 2.35 | 2.45 | .03¼ | .03¼ | .03¼ | .03¼ |
| Linseed Oil, kegs......100 lb. | 4.00 | 4.75 | 4.00 | 4.75 | .05½ | .05½ | .05½ | .05½ |
| Pyridine, 50 gal drums......gal. | 1.5) | 1.75 | 1.50 | 1.75 | 1.75 | 1.50 | 1.75 | 1.50 |
| Pyrites, Spanish cif Atlantic ports bulk.............unit | .12 | .13 | .12 | .13¾ | .13¾ | .13 | .13¾ | .13 |
| Quebracho, 35% liquid tks....lb. | .02¾ | .03 | .02¾ | .04 | .04 | .02¾ | .04 | .03 |
| 450 lb bbls c-1..........lb. | .03¼ | .03¾ | .03¼ | .03¾ | .03¾ | .03¼ | 04¼ | .03½ |
| 35% Bleaching, 450 lb bbl .lb. | .04 | .05¼ | .04 | .05¼ | .04¼ | .05¼ | .04¼ | .05¼ |
| Solid, 63%, 100 lb bales cif..lb. | ..... | .02½ | .02½ | .05½ | .05½ | .05 | .05¾ | .05¼ |
| Clarified, 64%, bales.....lb. | ..... | .03⅛ | .03⅛ | .05⅝ | .05⅝ | .05⅛ | .05⅝ | .05⅝ |
| Quercitron, 51 deg liquid 450 lb bbls.................lb. | .05½ | .06 | .05½ | .06 | .06 | .05½ | .06 | .05½ |
| Solid, 100 lb boxes.........lb. | .09½ | .13 | .09½ | .13 | .13 | .09½ | .13 | .10 |
| Bark, Rough...........ton | ..... | 14.00 | ..... | 14.00 | 14.00 | 14.00 | 14.00 | 14.00 |
| Ground................ton | 34.00 | 35.00 | 34.00 | 35.00 | 35.00 | 34.00 | 35.00 | 34.00 |
| R Salt, 250 lb bbls wks......lb. | .40 | .44 | .40 | .44 | .45 | .40 | .46 | .44 |
| Red Sanders Wood, grd bbls..lb. | ..... | .18 | ..... | .18 | .18 | .18 | .18 | .18 |
| Resorcinol Tech, cans........lb. | .65 | .70 | .65 | 1.25 | 1.25 | .90 | 1.25 | 1.15 |
| Rosin Oil, 50 gal bbls, first run ......................gal. | ..... | .47 | .47 | .58 | .58 | .56 | 62 | .57 |
| Second run............gal. | ..... | .51 | .51 | .61 | .61 | .59 | .64 | .60 |

## Rosin

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Rosins 600 lb bbls 280 lb...unit ex. yard N. Y. | | | | | | | | |
| B........................ | ..... | 3.85 | 3.75 | 4.95 | 7.75 | 5.35 | 9.25 | 7.45 |
| D........................ | ..... | 3.92½ | 3.80 | 5.50 | 8.00 | 5.50 | 9.25 | 7.70 |
| E........................ | ..... | 3.95 | 3.90 | 5.90 | 8.17 | 5.52½ | 9.27 | 8.30 |
| F........................ | ..... | 3.97½ | 3.95 | 6.20 | 8.45 | 5.55 | 9.27 | 8.40 |
| G........................ | ..... | 4.00 | 4.00 | 6.25 | 8.45 | 5.60 | 9.45 | 8.40 |
| H........................ | 4.02½ | 4.05 | 4.02½ | 6.30 | 8.55 | 5.60 | 9.50 | 8 40 |
| I........................ | 4.05 | 4.10 | 4.05 | 6.35 | 8.58 | 5.62½ | 9.50 | 8.40 |
| K........................ | 4.10 | 4.15 | 4.10 | 6.45 | 8.65 | 5.62½ | 9.55 | 8.45 |
| M........................ | ..... | 4.25 | 4.20 | 6.70 | 8.80 | 5.65 | 9.85 | 8.50 |
| N........................ | ..... | 5.50 | 4.85 | 6.95 | 8.95 | 6.05 | 10.30 | 8.93 |
| WG...................... | ..... | 6.65 | 6.15 | 8.15 | 9.25 | 6.85 | 11.30 | 9.00 |
| WW...................... | .... | 7.25 | 6.45 | 8.90 | 9.85 | 7.85 | 12.30 | 9.30 |
| Rotten Stone, bags mines....ton | 24.00 | 20.00 | 24.00 | 20.00 | 30.00 | 18.00 | 30.00 | 24.00 |
| Lump, imported, bbls......lb. | .05 | .07 | .05 | .07 | .07 | .05 | .08 | .05 |
| Selected bbls............lb. | .09 | .12 | .09 | .12 | .12 | .09 | .12 | .09 |
| Powdered, bbls............lb. | .02 | .05 | .02 | .05 | .05 | .02 | .05 | .02 |
| Sago Flour, 150 lb bags......lb. | .04½ | .05 | .04½ | .05 | .05 | .04½ | .05 | .04½ |
| Sal Soda, bbls wks.......100 lb. | .... | 1.00 | ..... | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Salt Cake, 94-96% c-1 wks. .ton | 14.00 | 15.50 | 14.00 | 19.00 | 24.00 | 15.50 | 24.00 | 19.00 |
| Chrome ...............ton | 13.00 | 14.50 | 13.00 | 17.00 | 25.00 | 14.50 | 21.00 | 12.00 |
| Saltpetre, double refd granular 450-500 lb bbls.........lb | .06½ | .06¾ | .06 | .06¾ | .06¾ | .06½ | .06½ | .06½ |
| Satin, White, 500 lb bbls.....lb | ..... | .01½ | ..... | .01½ | .01½ | .01⅛ | .01½ | .01½ |
| Shellac Bone dry bbls........lb. | .28 | .30 | .28 | .29 | .47 | .28 | .61 | .47 |
| Garnet, bags..............lb. | .19 | .20 | .19 | .26 | .40 | .24 | .45 | .40 |
| Superfine, bags............lb. | ..... | .17½ | .17½ | .22 | .39 | .20 | .47 | .39 |
| T. N. bags...............lb. | .16 | .16½ | .16 | .17 | .34 | .18 | .44 | .36 |
| Schaeffer's Salt, kegs.........lb. | .53 | .57 | .53 | .57 | .57 | .53 | .57 | .53 |
| Silica, Crude, bulk mines....ton | 8.00 | 11.00 | 8.00 | 11.00 | 11.00 | 8.00 | 11.00 | 8.00 |
| Refined, floated bags......ton | 22.00 | 30.00 | 22.00 | 30.00 | 30.00 | 22.00 | 30.00 | 22.00 |
| Air floated bags........ton | ..... | 32.00 | ..... | 32.00 | 32.00 | 32.00 | 32.00 | 32.00 |
| Extra floated bags......ton | 32.00 | 40.00 | 32.00 | 40.00 | 40.00 | 32.00 | 40.00 | 32.00 |
| Soapstone, Powdered, bags f. o. b. mines.................ton | 15.00 | 22.00 | 15.00 | 22.00 | 22.00 | 15.00 | 22.00 | 15.00 |

## Soda

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Soda Ash, 58% dense, bags c-1 wks................100 lb. | ..... | 1.17½ | ..... | 1.17½ | 1.40 | 1.40 | 1.40 | 1.40 |
| 58% light, bags.......100 lb. | ..... | 1.15 | ..... | 1.15 | 1.34½ | 1.34½ | 1.34½ | 1.34½ |
| Contract, bags c-1 wks.100 lb. | ..... | 1.15 | 1.15 | 1.15 | 1.32 | 1.32 | 1.32 | 1.32 |
| Soda Caustic, 76% grnd & flake drums..............100 lb. | ..... | 2.90 | ..... | 2.90 | 3.35 | 3.00 | 3.35 | 3.35 |
| 76% solid drs.........100 lb. | ..... | 2.50 | ..... | 2.50 | 2.95 | 2.90 | 2.95 | 2.95 |
| Sodium Acetate, tech....450 lb. bbls wks...............lb. | .04½ | .05 | .04½ | .06 | .05½ | .04 | .06¼ | .04¾ |
| Arsenate, drums..........lb. | .25 | .35 | .25 | .35 | .19 | .18 | .19 | .18 |
| Arsenite, drums...........gal. | .50 | .75 | .50 | .75 | 1.00 | .50 | 1.50 | .75 |
| Bicarb, 400 lb bbl NY..100 lb. | ..... | 2.35 | 2.35 | 2.35 | 2.41 | 2.41 | 2.41 | 2.41 |

# Prices Current and Comment

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

Province. So far they have not been notably successful, some of the sites chosen having proved unsuitable. The planting methods first tried are being abandoned for intensive cultivation and the scientific use of manures. The Kundri lac area is already established, and is being run on commercial lines.

**Sodium Phosphate** — The price tone in both the di and tri salts was better in October. Shipments into the silk-weighting centers were in larger volume than in September. Repackers of the tri salt were also said to be ordering ahead in larger quantities. No indication was given by producers during the month of prices to be offered for 1932 but the opinion was expressed that the current quotations would be the basis for next year's contracts.

**Sodium Silicate** — A fair demand from the box trade continues through October but sales in other channels were below September.

**Stearates** — As the month closed no change was made in quotations to compensate for lower stearic acid prices but it was thought in some quarters that a reduction would be affected shortly.

**Tin** — The metal price failed to reflect the curtailment in production. Malayan exports of tin during September amounted to 2,558 tons or 1,223 tons less than the September quota. Exports from Dutch East Indies were 2,233; Nigeria 545; Bolivia 2,614 and Siam 836. Total, including Malaya, was 8,786. That is at the annual rate of 105,432 tons. The respective monthly export quotas are: Dutch East Indies 2,097, Nigeria 561, Bolivia 2,402, Malaya 3,781, Siam 833; total 9,674. Actual exports thus were 888 tons below the quota allowance.

**Toluene** — Although consumption figures were greatly below normal the market remained in a firm position due to the lack of activity in steel centers.

**Whiting** — Ground limestone material was advanced 50c a ton during the month, the new price being $6.50. Less carlot prices remained unaltered.

**Wood Flour** — A reduction of $2 a ton was placed in effect by some importers bringing the new level down to $26. Some shading from this quotation was reported.

**Zinc** — The metal declined during the month in the face of little interest from consumers and as the month closed it was quoted at $3.25 East St. Louis.

**Fish Scrap** — More activity was in evidence and sales were reported at $2.00 and 10c per unit, f. o. b. factory.

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Bichromate, 500 lb cks wks.lb. | .06½ | .07 | .06½ | .07½ | .07½ | .07 | .07¾ | .07 |
| Bisulfite. 500 lb bbl wks....lb. | ..... | .04 | ..... | .04 | .04 | .04 | .04 | .04 |
| Chlorate, .......... wks..lb. | .05¾ | .07¾ | .05¾ | .07¾ | .08 | .05¾ | .11 | .06½ |
| Chloride, technical........ton | 12.00 | 13.00 | 12.00 | 13.00 | 13.00 | 12.00 | 13.00 | 12.00 |
| Cyanide, 96-98%, 100 & 250 lb drums wks...........lb. | .16 | .17 | .16 | .17 | .20 | .16 | .20 | .18 |
| Fluoride, 300 lb bbls wks...lb. | .07 | .07½ | .07 | .08½ | .09 | .08½ | .09 | .08½ |
| Hydrosulfite, 200 lb bbls f. o. b. wks..................lb. | .22 | .24 | .22 | .24 | .24 | .22 | .24 | .22 |
| Hypochloride solution, 100 lb cbys................lb. | ..... | .05 | ..... | .05 | .05 | .05 | .05 | .05 |
| Hyposulfite, tech, pea cyrs 375 lb bbls wks......100 lb. | 2.40 | 3.00 | 2.40 | 3.00 | 3.00 | 2.40 | 3.05 | 2.50 |
| Technical, regular crystals 375 lb bbls wks....100 lb. | 2.40 | 2.65 | 2.40 | 2.65 | 2.65 | 2.50 | 2.65 | 2.40 |
| Metanilate, 150 lb bbls.... lb. | .44 | .45 | .44 | .45 | .45 | .44 | .45 | .45 |
| Metasilicate, c-l, wks...100 lb. | ..... | 4.00 | ..... | 4.00 | ..... | ..... | ..... | ..... |
| Monohydrate, bbls.........lb. | ..... | .02½ | ..... | .02½ | .02½ | .02½ | .02½ | .02½ |
| Naphthionate, 300 lb bbl...lb. | .52 | .54 | .52 | .54 | .57 | .52 | .57 | .54 |
| Nitrate, 92%, crude, 200 lb bags c-1 NY......100 lb. | ..... | 1.73½ | 1.73½ | 2.07 | 2.22½ | 1.99 | 2.22½ | 2.09 |
| Nitrite, 500 lb bbls spot....lb. | .07½ | .08 | .07½ | .08 | .08 | .07½ | .08 | .07½ |
| Orthochlorotoluene, sulfonate, 175 lb bbls wks.......lb | .25 | .27 | .25 | .27 | .27 | .25 | .27 | .25 |
| Perborate, 275 lb bbls.....lb. | .18 | .20 | .18 | .20 | .20 | .18 | .22 | .18 |
| Phosphate, di-sodium, tech. 310 lb bbls........100 lb. | 2.50 | 3.00 | 2.50 | 3.00 | 3.25 | 2.65 | 3.55 | 3.25 |
| tri-sodium, tech, 325 lb bbls...............100 lb. | ..... | 3.20 | 3.15 | 3.50 | 4.00 | 3.25 | 4.00 | 3.90 |
| Picramate, 100 lb kegs.....lb. | .69 | .72 | .69 | .72 | .72 | .69 | .72 | .69 |
| Prussiate, Yellow, 350 lb bbl wks..................lb. | .11½ | .12 | .11½ | .12 | 12½ | .11½ | .12½ | .12 |
| Pyrophosphate, 100 lb keg..lb. | .15 | .20 | .15 | .20 | .20 | .15 | .20 | .15 |
| Silicate, 60 deg 55 gal drs, wks ...............100 lb. | 1.65 | 1.70 | 1.65 | 1.70 | 1.70 | 1.6 | 1.70 | 1.65 |
| 40 deg 55 gal drs, wks ................100 lb. | ..... | .75 | .75 | 1.00 | .80 | .70 | .80 | .70 |
| Silicofluoride, 450 lb bbls NY ......................lb. | .04½ | .04¾ | .04 | .04¾ | .05½ | .04 | .05½ | .05 |
| Stannate, 100 lb drums....lb. | .19 | .21 | .19 | .26 | .43 | .24 | .43 | .38 |
| Stearate, bbls.............lb. | .20 | .25 | .20 | .25 | .29 | .20 | .29 | .25 |
| Sulfanilate, 400 lb bbls.....lb. | .16 | .18 | .16 | .18 | .18 | .16 | .18 | .16 |
| Sulfate Anhyd, 550 lb bbls c-1 wks..............lb. | .02 | .02¾ | .02 | .02¾ | .02¾ | .02½ | .02¾ | .02½ |
| Sulfide, 80% crystals, 440 lb bbls wks.............lb. | .02½ | .02¾ | .02½ | .02¾ | .02¾ | .02½ | .02¾ | .02½ |
| 62% solid, 650 lb drums lc-1 wks.............lb. | .03 | .03½ | .03 | .03½ | .03½ | .03 | .04 | .03½ |
| Sulfite, crystals, 400 lb bbls wks.................lb. | .03 | .03½ | .03 | .03½ | .03½ | .03 | .03½ | .03 |
| Sulfocyanide, bbls.........lb. | .28 | .35 | .28 | .35 | .35 | .28 | .76 | .28½ |
| Tungstate, tech, crystals, kegs .....................lb. | .80 | .88 | .80 | .88 | .88 | .81 | 1.40 | .88 |
| Solvent Naphtha, tanks....... wks.................gal. | .26 | .28 | .24 | .38 | .40 | .30 | .40 | .35 |
| Spruce, 25% liquid, bbls.....lb. | ..... | .01 | .01 | .01½ | .01½ | .01½ | .01½ | .01½ |
| 25% liquid, tanks wks.....lb. | ..... | .01 | ..... | .01 | .01 | .01 | .01 | .01 |
| 50% powd, 100 lb bag wks lb. | .02 | .02½ | .02 | .02½ | .02½ | .02 | .02½ | .02 |
| Starch, powd., 140 lb bags ....................100 lb. | ..... | 2.57 | 2.57 | 3.20 | 4.02 | 3.42 | 4.12 | 3.82 |
| Pearl, 140 lb bags.....100 lb. | ..... | 2.77 | 2.77 | 3.00 | 3.92 | 3.32 | 4.02 | 3.72 |
| Potato, 200 lb bags........lb. | .05½ | .06 | .05½ | .06 | .06½ | .05½ | .06¾ | .05¾ |
| Imported bags..........lb. | .05¾ | .06½ | .05¾ | .06½ | .06¾ | .05¾ | .06¾ | .05¾ |
| Soluble................lb. | .08 | .08½ | .08 | .08½ | .08½ | .08 | .08½ | 08 |
| Rice, 200 lb bbls..........lb. | .09 | .10 | .09 | .10 | .10 | .09 | .10 | .09½ |
| Wheat, thick bags.........lb. | .06½ | .07 | .06½ | .07 | .07 | .06½ | .07 | .06½ |
| Thin bags.............lb. | .09½ | .10 | .09½ | .10 | .10 | .09½ | .10 | .09½ |
| Strontium carbonate, 600 lb bbls wks..................lb. | .07½ | .07½ | .07½ | .07½ | .07½ | .07½ | .07½ | .07½ |
| Nitrate, 600 lb bbls NY....lb. | .07 | .07½ | .07 | .09½ | .09½ | .09 | .09½ | .08½ |
| Peroxide, 100 lb drs.......lb. | ..... | 1.25 | ..... | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |

## Sulfur

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Sulfur Brimstone, broken rock, 250 lb bag c-1.......100 lb. | ..... | 2.05 | ..... | 2.05 | 2.05 | 2.05 | 2.05 | 2.05 |
| Crude, f. o. b. mines......ton | 18.00 | 19.00 | 18.00 | 19.00 | 19.00 | 18.00 | 19.00 | 18.00 |
| Flour for dusting 99½%, 100 lb bags c-1 NY....100 lb. | ..... | 2.40 | ..... | 2.40 | 2.40 | 2.40 | 2.40 | 2.40 |
| Heavy bags c-1......100 lb. | ..... | 2.50 | ..... | 2.50 | 2.50 | 2.50 | 2.50 | 2.50 |
| Flowers, 100%, 155 lb bbls c-1 NY..............100 lb. | ..... | 3.45 | ..... | 3.45 | 3.45 | 3.45 | 3.45 | 3.45 |
| Roll, bbls lc-1 NY.....100 lb. | 2.65 | 2.85 | 2.65 | 2.85 | 2.85 | 2.65 | 2.85 | 2.65 |
| Sulfur Chloride, red, 700 lb drs wks.....................lb. | .05 | .05½ | .05 | .05½ | .05½ | .05 | .05½ | .05 |
| Yellow, 700 lb drs wks.....lb. | .03½ | .04½ | .03½ | .04½ | .04½ | .03½ | .04½ | .03½ |
| Sulfur Dioxide, 150 lb cyl....lb. | .07 | .07½ | .07 | .07½ | .07½ | .07 | .08½ | .07 |
| Extra, dry, 100 lb cyl......lb. | .10 | .12 | .10 | .12 | .12 | .10 | .19 | .10 |
| Sulfuryl Chloride,.........lb. | .15 | .40 | .15 | .40 | .65 | .10 | .65 | .10 |
| Talc, Crude, 100 lb bgs NY...ton | 12.00 | 15.00 | 12.00 | 15.00 | 15.00 | 12.00 | 15.00 | 12.00 |
| Refined, 100 lb bgs NY..ton | 16.00 | 18.00 | 16.00 | 18.00 | 18.00 | 16.00 | 18.00 | 16.00 |
| French, 220 lb bags NY...ton | 18.00 | 22.00 | 18.00 | 22.00 | 22.00 | 18.00 | 25.00 | 18.00 |
| Refined, white, bags....ton | 35.00 | 40.00 | 35.00 | 40.00 | 40.00 | 35.00 | 45.00 | 35.00 |
| Italian, 220 lb bags NY...ton | 40.00 | 50.00 | 40.00 | 50.00 | 50.00 | 40.00 | 50.00 | 40.00 |
| Refined, white, bags....ton | 50.00 | 55.00 | 50.00 | 55.00 | 55.00 | 50.00 | 55.00 | 50.00 |
| Superphosphate, 16% bulk, wks...................ton | ..... | 7.50 | 7.50 | 9.00 | 9.50 | 8.00 | 10.00 | 9.00 |
| Triple bulk, wks.........unit | ..... | .65 | ..... | .65 | .65 | .65 | ..... | ..... |
| Tankage Ground NY.......unit | ..... | 1.50&10 | 1.50 | 3.20&10 | 4.00&10 | 3.20&10 | 4.50&10 | 4.00&10 |
| High grade f.o.b. Chicago.unit | ..... | 1.50&10 | 1.50 | 3.25&10 | 3.85&10 | 3.25&10 | 4.80&10 | 3.75&10 |
| South American cif.......unit | ..... | 2.25&10 | 2.00 | 3.40&10 | 4.25&10 | 3.40&10 | 4 80&10 | 4.35&10 |
| Tapioca Flour, high grade bgs.lb. | .03½ | .05 | .03½ | .05 | .05¾ | .03 | .05¾ | .04¾ |
| Medium grade, bags.....lb. | .03 | .04 | .03 | .04 | .04¾ | .02½ | .04¾ | .03¾ |
| Tar Acid Oil, 15%,drums....gal. | .24 | .25 | .24 | .25 | .27 | .24 | .27 | .26 |
| 25% drums............gal. | .26 | .28 | .26 | .28 | .30 | .26 | .30 | .29 |

# Prices Current and Comment

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

## OILS AND FATS

**Animal Oils** — Demand from consuming channels was generally in small volume but prices were firmly held.

**Chinawood Oil** — A much firmer tone was in evidence and on the coast 6c was firmly adhered to for prompt shipment and also for the last quarter. Offerings from abroad were light which had a salutary effect on the tone of the market. Total tung oil exports from Hankow during August reached 8,716,000 pounds, of which 6,924,000 pounds went to the United States and 1,792,000 pounds to Europe, according to a cablegram received by the Department of Commerce. It was estimated that the stocks of oil on hand at Hankow at the end of September amounted to approximately 700 short tons. Market quotations have been computed by the chemical division and conversion rates and equivalents in United States currency have been calculated at the current cable quotation of the Shanghai tael. The range of prices during September at Hankow go down for processed oil, naked, less overhead taxes, packing, coolie hire, insurance and other incidental charges were as follows:

| | *Open | High | Low | Close |
|---|---|---|---|---|
| Hankow taels per picul.......... | 22.50 | 21.50 | 21.80 | 22.00 |
| American dollars price per lb.... | $0.051 | $0.052 | $0.050 | $0.051 |

From the following statistics it will be observed that September exports of oil from Hankow were higher than for the previous month, whereas total shipments to the United States for the first nine months of this year decreased about 42 per cent as compared with the quantity exported for the corresponding period in 1930:

| | Pounds Total Exports | Pounds To United States | Hankow Stock Short Tons |
|---|---|---|---|
| September, 1931.. | 8,716,000 | 6,924,000 | 700 |
| August, 1931.... | 5,808,000 | 4,294,000 | 1,300 |
| September, 1930.. | 13,120,000 | 11,200,000 | 7,360 |
| Jan.-Sept., 1931.. | 74,032,000 | 60,390,000 | .... |
| Jan.-Sept., 1930.. | 124,498,000 | 94,900,000 | .... |

**Cocoanut Oil** — A slightly better tone was in evidence and although published prices showed little forward movement a disposition against further shading was experienced both in the primary and domestic markets.

**Copra** — In response to firmer conditions in primary markets the price level in this country showed much firmer tendencies than have existed in this item for several months. Consular invoices will be required for shipments of copra valued at more than $100 under a decision of the Commissioner of Customs which takes effect within 60 days.

*Dept. of Commerce

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Terra Alba Amer. No. 1, bgs or bbls mills.........100lb. | 1.15 | 1.75 | 1.15 | 1.75 | 1.75 | 1.15 | 1.75 | 1.15 |
| No. 2 bags or bbls...100lb. | 1.50 | 2.00 | 1.50 | 2.00 | 2.00 | 1.50 | 2.00 | 1.50½ |
| Imported bags............lb. | .01⅛ | .01¼ | .01⅛ | .01¼ | .01¼ | .01⅛ | .02¼ | .01 |
| Tetrachlorethane, 50 gal dr...lb. | .09 | .09½ | .09 | .09½ | .09½ | .09 | .09½ | .09 |
| Tetralene, 50 gal drs wks.....lb. | ..... | .20 | ..... | .20 | .20 | .20 | .20 | .20 |
| Thiocarbanilid, 170 lb bbl....lb. | .25 | .28½ | .25 | .28½ | .28½ | .22 | .24 | .22 |
| Crystals, 500 lb bbls wks...lb. | .24 | .25 | .24 | .28½ | .34 | .25 | .38 | .33 |
| Metal Straits NY.........lb. | .22¼ | .23 | .22¼ | .27 | .38 | .26 | .48 | .39 |
| Oxide, 300 lb bbls wks.....lb. | ..... | .26 | .25 | .29 | .42 | .25 | .56 | .42 |
| Tetrachloride, 100 lb drs wks .........................lb. | .1695 | .1785 | .1695 | .19½ | .20½ | .18¼ | .30½ | .27½ |
| Titanium Dioxide 300 lb bbl..lb | .20½ | .21 | .20½ | .22 | .50 | .21 | .50 | .22 |
| Pigment, bbls...........lb. | 06½ | .07¾ | .06½ | .07¾ | .07¾ | .06½ | .14 | .07½ |
| Toluene, 110 gal drs........gal. | ..... | .35 | .34 | .35 | .40 | .35 | .45 | .45 |
| 8000 gal tank cars wks....gal. | ..... | .30 | .27 | .30 | .35 | .30 | .40 | .40 |
| Toluidine, 350 lb bbls........lb. | .88 | .89 | .88 | .94 | .94 | .90 | .94 | .90 |
| Mixed, 900 lb drs wks.....lb. | .27 | .32 | .27 | .32 | .32 | .27 | .32 | .31 |
| Toner Lithol, red, bbls.......lb. | .90 | .95 | .90 | .95 | .95 | .90 | .95 | .85 |
| Para, red, bbls............lb. | ..... | .80 | ..... | .80 | .80 | .80 | .80 | .70 |
| Toluidine ................lb. | 1.50 | 1.55 | 1.50 | 1.55 | 1.55 | 1.50 | 1.55 | 1.50 |
| Triacetin, 50 gal drs wks.....lb. | .32 | .36 | .32 | .36 | .36 | .32 | .36 | .32 |
| Trichlorethylene, 50 gal dr...lb. | .10 | .10½ | .10 | .10½ | .10½ | .10 | .10½ | .10 |
| Triethanolamine, 50 gal drs...lb. | .40 | .42 | .40 | .42 | .42 | .40 | .60 | .55 |
| Tricresyl Phosphate, drs.....lb. | .26 | .35 | .26 | .45 | .45 | .33 | .45 | .33 |
| Triphenyl guanidine.........lb. | .58 | .60 | .58 | .60 | .60 | .58 | .70 | .58 |
| Phosphate, drums.........lb. | .50 | .65 | .50 | .70 | .70 | .60 | .75 | .60 |
| Tripoli, 500 lb bbls......100 lb. | .75 | 2.00 | 75 | 2.00 | 2.00 | 1.75 | 2.00 | 1.75 |
| Tungsten, Wolframite,..per unit | 11.00 | 11.75 | 11.00 | 11.75 | ..... | ..... | ..... | ..... |
| Turpentine carlots, bbls.....gal. | ..... | .37½ | .36¼ | .57 | .61¼ | .41 | .65 | .51½ |
| Wood Steam dist. bbls....gal. | ..... | .40 | .38 | .61 | .52 | .36 | .57 | .49 |
| Urea, pure, 112 lb cases......lb | .15 | .17 | .15 | .17 | .17 | .15 | .30 | .15 |
| Fert. grade, bags c.i.f.....ton | .... | 82.60 | ..... | 82.60 | 108.00 | 108.00 | 105.00 | 98.00 |
| c. i. f. S. points.........ton | ..... | 82.60 | ..... | 82.60 | 109.30 | 109.30 | 106.30 | 99.30 |
| Valonia Beard, 42%, tannin bags..................ton | 34.00 | 35.00 | 34.00 | 40.00 | 40.00 | 39.50 | 55.00 | 42.00 |
| Cups, 30-31% tannin.....ton | 22.50 | 23.50 | 22.50 | 25.00 | 27.00 | 24.00 | 35.00 | 30.00 |
| Mixture, bark, bags.......ton | 25.00 | 26.00 | 25.00 | 31.00 | 32.50 | 30.00 | 43.00 | 35.00 |
| Vermillion, English, kegs....lb.. | 1.53 | 1.80 | 1.53 | 1.80 | 2.05 | 1.75 | 2.05 | 2.00 |
| Vinyl Chloride, 16 lb cyl.....lb. | ..... | 1.00 | ..... | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Wattle Bark, bags..........ton | 32.00 | 34.50 | 32.00 | 41.00 | 47.75 | 40.00 | 49.75 | 43.50 |
| Extract 55%, double bags ex-dock...................lb. | .05 | .06½ | .05 | .06½ | .06½ | .05⅞ | .06½ | .06½ |
| Whiting, 200 lb bags, c-1 wks ...................100 lb. | .85 | 1.00 | .85 | 1.00 | 1.00 | 1.00 | 1.25 | 1.00 |
| Alba, bags c-1 NY........ton | ..... | 13.00 | ..... | 13.00 | 13.00 | 13.00 | 13.00 | 13.00 |
| Gilders, bags c-1 NY...100 lb. | ..... | 1.35 | ..... | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
| Xylene, 10 deg tanks wks. .gal. | ..... | .29 | ..... | .29 | .31 | .28 | .33 | .33 |
| Commercial, tanks wks...gal. | ..... | .26 | .24 | .30 | .33 | .25 | .32 | .30 |
| Xylidine, crude.............lb. | .36 | .37 | .36 | .37 | .38 | .37 | .38 | .38 |

### Zinc

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Zinc Ammonium Chloride powd., 400 lb bbls.........100 lb. | 5.25 | 5.75 | 5.25 | 5.75 | 5.75 | 5.25 | 5.75 | 5.25 |
| Carbonate Tech, bbls NY..lb. | .10½ | .11 | .10½ | .11 | .11 | .10½ | .11 | .10½ |
| Chloride Fused, 600 lb drs. wks...................lb. | .05¾ | .06 | .05¾ | .06 | .06 | .05¾ | .06 | .05¾ |
| Gran., 500 lb bbls wks.....lb. | .05¾ | .06 | .05¾ | .06 | .06½ | .05¾ | .06½ | .06½ |
| Soln 50%, tanks wks...100 lb. | 2.25 | 3.00 | 2.25 | 3.00 | 3.00 | 2.25 | 3.00 | 3.00 |
| Cyanide, 100 lb drums.....lb. | .38 | .39 | .38 | .39 | .41 | .38 | .41 | .40 |
| Dithiofuroate, 100 lb dr....lb. | ..... | 1.00 | ..... | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Dust, 500 lb bbls c-1 wks...lb. | .0535 | .0585 | .0535 | .07 | .11 | .06 | .08¼ | .08½ |
| Metal, high grade slabs c-1 NY................100 lb. | ..... | 3.55 | 3.55 | 4.45 | 6.45 | 4.10 | 6.45 | 6.45⅞ |
| Oxide, American bags wks..lb. | .06½ | .07 | .06½ | .07 | .07⅞ | .06½ | .07⅞ | .07 |
| French, 300 lb bbls wks...lb. | .09⅞ | .11⅞ | .09⅞ | .11⅞ | .11⅞ | .09⅞ | .11⅞ | .09⅞ |
| Perborate, 100 lb drs.......lb. | ..... | 1.25 | ..... | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Peroxide, 100 lb drs.......lb. | ..... | 1.25 | ..... | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Stearate, 50 lb bbls........lb. | .18½ | .22 | .18½ | .23 | .26 | .20 | .26 | .25 |
| Sulfate, 400 bbl wks.......lb. | .03 | .03½ | .03 | .03½ | .03½ | .03 | .03¾ | .03 |
| Sulfide, 500 lb bbls........lb. | .13 | .13½ | .13 | .16½ | .32 | .16 | .32 | .30 |
| Sulfocarbolate, 100 lb keg..lb. | .22 | .24 | .22 | .30 | .30 | .28 | .30 | .28 |
| Zirconium Oxide, Nat. kegs...lb. | .02½ | .03 | .02½ | .03 | .03 | .02½ | .03 | .02½ |
| Pure kegs................lb. | .45 | .50 | .45 | .50 | .50 | .45 | .50 | .45 |
| Semi-refined kegs..........lb. | .08 | .10 | .08 | .10 | .10 | .08 | .10 | .08 |

## Oils and Fats

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Castor, No. 1, 400 lb bbls.....lb. | .11 | .11½ | .11 | .12 | .13½ | .11½ | .13½ | .13 |
| No. 3, 400 lb bbls.........lb. | .10¾ | .11 | .10½ | .11¾ | .13 | .11 | .13 | .12½ |
| Blown, 400 lb bbls........lb. | .13¾ | .14 | .13¾ | .14 | .15 | .12 | .15 | .14 |
| China Wood, bbls spot NY...lb. | ..... | .07½ | .07 | .07½ | .13 | .07 | .16 | .14½ |
| Tanks, spot NY.........lb. | ..... | .06½ | .06 | .07 | .11⅞ | .06 | .15 | .13½ |
| Coast, tanks,...........lb. | ..... | .06 | .05½ | .06½ | .10⅞ | .05½ | .14½ | .12½ |
| Cocoanut, edible, bbls NY....lb. | .... | .10¾ | ..... | .10¾ | .10¾ | .10¾ | .10¾ | .10¾ |
| Ceylon, 375 lb bbls NY....lb. | .04⅝ | .04¾ | .04⅝ | .06½ | .08¼ | .06⅞ | .09½ | .07⅞ |
| 8000 gal tanks NY......lb. | .04 | .04⅛ | .04 | .06 | .07 | .05½ | .08⅞ | .06⅞ |
| Cochin, 375 lb bbls NY....lb. | .05⅛ | .06 | .05⅛ | .07 | .09¼ | .07¼ | .10 | .09¾ |
| Tanks NY..............lb. | .04¾ | .05 | .04⅝ | .05¾ | .08⅛ | .07 | .09½ | .08⅞ |
| Manila, bbls NY..........lb. | .04⅝ | .05 | .04⅝ | .07 | .08¼ | .06⅛ | .09⅛ | .07⅞ |
| Tanks NY..............lb. | ..... | .03½ | .03⅞ | .05⅛ | .07⅛ | .05⅞ | .08⅞ | .06⅞ |
| Tanks, Pacific Coast.....lb. | ..... | .03⅛ | .03 | .05 | .07 | .05⅛ | 08 | .06⅞ |

# Prices Current and Comment

**Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Oct. 1931 $1.46**

**Fish Oils** — Steady prices, light offerings and firm prices continued to feature the market in this division with the exception of Menhaden. All but four of the Menhaden oil factories operating in the Chesapeake Bay section have closed down for the season and are now making efforts to unload before cold weather sets in. Some of the factories are reported to have closed contracts for large quantities of oil at an unnamed figure but the spot market remains stagnant at 15c a gallon f. o. b. Baltimore, and it is said that larger quantities of oil will be carried over this season than last year, when approximately 25,000 barrels remained unsold.

**Linseed Oil** — Linseed prices fluctuated but slightly during the month. The general tendency was upward however in the face of higher prices for flaxseed. Contract shipments were in fair volume but spot business was off. Twenty-six flaxseed-crushing mills were in operation in the United States during the third quarter of this year, according to preliminary figures of the Bureau of the Census. These mills reported a crush of 213, 083 tons of flaxseed and production of 141,204,905 pounds of linseed oil. These figures compare with 164,834 tons of seed crushed and 108,236,266 pounds of oil produced in the corresponding quarter of 1930, 288,983 tons of seed and 191,977,215 pounds of oil in 1929, 212,882 tons of seed and 141,888,625 pounds of oil in 1928, 253,431 tons of seed and 169,273,970 pounds of oil in 1927, and 265,995 tons of seed and 174,056,852 pounds of oil in 1926 (corresponding quarters). Stocks of flaxseed at the mills September 30 amounted to 118,760 tons, compared with 94,730 tons at the same date in 1930, 90,327 tons in 1929, 103,206 tons in 1928, 119,229 tons in 1927, and 70,196 tons in 1926. Stocks of linseed oil reported by the crushers were 76,150,682 pounds September 30, compared with 53,174,928 pounds at the same date in 1930, 82,991,738 pounds in 1929, 78,623,882 pounds in 1928, 76,563,440 pounds in 1927, and 66,957,976 pounds in 1926.

**Olive Oil Foots** — A quickening in demand was reported in some quarters and prices were firmer in October than in the previous month.

**Stearic Acid** — Producers lowered quotations on single and double pressed ½c but the price level on triple pressed remained unaltered.

**Tallow** — This item was more active as the month closed and sales were reported at 3¼c per lb. for extra.

| | Current Market | | 1931 Low | 1931 High | 1930 High | 1930 Low | 1929 High | 1929 Low |
|---|---|---|---|---|---|---|---|---|
| Cod, Newfoundland, 50gal bbls ........ gal. | .26 | .30 | .26 | .48 | .56 | .46 | .64 | .57½ |
| Tanks NY ........ gal. | .24 | .26 | .24 | .45 | .62 | .48 | .60 | .60 |
| Cod Liver see Chemicals ........ | | | | | | | | |
| Copra, bags ........ lb. | .0195 | .0275 | .0195 | .0325 | .046 | .039 | .05½ | .042 |
| Corn, crude, bbls NY ........ lb. | .05¾ | .09 | .05¾ | .09 | .10 | .08½ | .10¾ | .09¼ |
| Tanks, mills ........ lb. | .04⅛ | .05 | .04⅛ | .07½ | .08 | .06½ | .09⅛ | .07¾ |
| Refined, 375 lb bbls NY ........ lb. | .06¾ | .07 | .06¾ | .10½ | .10½ | .09½ | .11¾ | .10¼ |
| Tanks ........ lb. | .08½ | .08¾ | .08 | .08¾ | .10 | .08 | .11 | .09 |
| Cottonseed, crude, mill ........ lb. | ..... | .04⅛ | .04⅛ | .07 | .07½ | .06½ | .09 | .08¼ |
| PSY, Oct. 1 ... 100 lb bbls spot | 3.46 | 4.00 | ..... | ..... | ..... | ..... | ..... | ..... |
| Degras, American, 50 gal bbls NY ........ lb. | .03¼ | .04 | .03¼ | .04¼ | .04¼ | .03¼ | .05 | .03¼ |
| English, brown, bbls NY ........ lb. | ..... | .04 | .04 | .05 | .05 | .04½ | .05⅝ | .04½ |
| Light, bbls NY ........ lb. | .04 | .04½ | .04 | .05½ | .05½ | .05 | .05¾ | .05 |
| Dog Fish, Coast Tanks ........ gal. | ..... | .32 | ..... | 32 | .34 | .32 | | |
| **Greases** | | | | | | | | |
| Greases, Brown ........ lb. | .02 | .02¼ | .02 | .04¼ | .06½ | .04 | .08½ | .06 |
| Yellow ........ lb. | .02 | .02½ | .02 | .05 | .07½ | .03⅞ | .08½ | .06½ |
| White, choice bbls NY ........ lb | .03¼ | .03¾ | .03¼ | .05¾ | .08½ | .06 | .11½ | .07½ |
| Herring, Coast, Tanks ........ gal. | ..... | Nom. | ..... | Nom. | ..... | ..... | | |
| Horse, bbls ........ lb. | .05¼ | Nom. | .05¼ | Nom. | Nom. | .05¼ | Nom. | ..... |
| Lard Oil, edible, prime ........ lb. | .11¼ | .11¾ | .11¼ | .13 | .13½ | .12½ | .15¾ | .14¾ |
| Extra, bbls ........ lb. | .... | .07½ | .07½ | .10 | .12 | .10 | .13½ | .12 |
| Extra No. 1, bbls ........ lb. | ..... | .07¾ | .06¾ | .09¾ | .11 | .09¾ | .13¼ | .11¾ |
| Linseed, Raw, five bbl lots ........ lb. | ..... | .087 | .082 | .102 | .146 | .096 | .162 | .105 |
| Bbls c-1 spot ........ lb. | ..... | .079 | .074 | .098 | .142 | .092 | .158 | .101 |
| Tanks ........ lb. | ..... | .073 | .068 | .092 | .134 | .086 | .15 | .093 |
| Menhaden Tanks Baltimore ........ gal. | .14 | .15 | .14 | .22 | .50 | .21 | .52 | .45 |
| Extra, bleached, bbls NY ........ gal. | .38 | .40 | .38 | .53 | .70 | .52 | .70 | .70 |
| Light, pressed, bbls NY ........ gal. | .33 | .34 | .33 | .38 | .64 | .36 | .64 | .63 |
| Yellow, bleached, bbls NY ........ gal. | .30 | .31 | .30 | .42 | 67 | .38 | .67 | .66 |
| Mineral Oil, white, 50 gal bbls ........ gal. | .40 | .60 | .40 | .60 | .60 | .40 | .60 | .40 |
| Russian, gal ........ gal. | .95 | 1.00 | .95 | 1.00 | 1.00 | .95 | 1.00 | .95 |
| Neatsfoot, CT, 20° bbls NY ........ lb. | .13¼ | .14 | .13¼ | .16 | .17⅝ | .16½ | .19 | .18½ |
| Extra, bbls NY ........ lb | .07¾ | .08 | .07 | .10 | .11⅛ | .09½ | .13½ | .12 |
| Pure, bbls NY ........ lb. | .04½ | .09¾ | .09½ | .12 | .13⅛ | .11½ | .15½ | .13½ |
| Oleo, No. 1, bbls NY ........ lb. | ..... | .06⅝ | .06⅝ | .08 | .12½ | .08⅞ | .11⅛ | .10¾ |
| No. 2, bbls NY ........ lb. | ..... | .06⅛ | .05¾ | .08 | .11 | .08⅛ | .11¼ | .10 |
| No. 3, bbls NY ........ lb. | ..... | .06¾ | .06¾ | .09 | .10½ | .09 | .10½ | .09¾ |
| Olive, denatured, bbls NY ........ gal. | .72 | .75 | .72 | .80 | 1.00 | .70 | 1.40 | 1.05 |
| Edible, bbls NY ........ gal. | 1.50 | 2.00 | 1.50 | 2.00 | 2.00 | 1.75 | 2.00 | 1.95 |
| Foots, bbls NY ........ lb. | .04¾ | .06⅜ | 04¾ | .06¾ | .08 | .06 | .11½ | .08½ |
| Palm, Kernel, Casks ........ lb. | .04½ | .05 | .04½ | .06¼ | .08¼ | .06 | .09 | .08 |
| Lagos, 1500 lb casks ........ lb. | .04 | .05 | .04 | .06 | .07¾ | .05¾ | .09 | .07½ |
| Niger, Casks ........ lb. | .03½ | .04 | .03½ | .05¼ | .07½ | .05¼ | .08¾ | .07 |
| Peanut, crude, bbls NY ........ lb. | ..... | Nom. | .05 | .05 | Nom. | ..... | Nom. | ..... |
| Refined, bbls NY ........ lb. | .08½ | .09 | .08½ | .14 | .15 | .12 | .15 | .14½ |
| Perilla, bbls NY ........ lb. | .06¾ | .07½ | 06¾ | .11 | .14½ | .10 | 20 | .15 |
| Tanks, Coast ........ lb. | ..... | .05½ | .05½ | .09 | .11½ | .08 | .15⅜ | .13 |
| Poppyseed, bbls NY ........ gal. | 1.70 | 1.75 | 1.70 | 1.75 | 1.75 | 1.70 | 1.75 | 1.70 |
| Rapeseed, blown, bbls NY ........ gal. | .68 | .70 | .68 | .73 | 1.00 | .74 | 1.04 | 1.04 |
| English, drms. NY ........ gal. | ..... | .75 | ..... | .75 | .82 | .75 | .90 | .82 |
| Japanese, drms. NY ........ gal. | .56 | .58 | .56 | .58 | .70 | .56 | .88 | .72 |
| Red, Distilled, bbls ........ lb. | .07⅜ | .07¾ | 07⅜ | .09 | .10⅜ | .08⅜ | .11½ | .10½ |
| Tanks ........ lb. | ..... | .06½ | .06½ | .08¼ | .09¼ | .07¾ | 10½ | .09½ |
| Salmon, Coast, 8000 gal tks. ........ gal. | ..... | .19 | .19 | .22 | .44 | .42 | .44 | .42 |
| Sardine, Pacific Coast tks ........ gal. | .17 | .17½ | .17 | .19 | .42 | .18 | .51 | .45 |
| Sesame, edible, yellow, dos ........ lb. | .08½ | .09 | .08½ | .10¾ | .12 | .09 | .12 | .11½ |
| White, dos ........ lb. | ..... | .11 | .10 | .12 | .12½ | .10 | .12½ | .12½ |
| Sod, bbls NY ........ gal. | ..... | .40 | ..... | .40 | .40 | .40 | .40 | .40 |
| Soy Bean, crude ........ | | | | | | | | |
| Pacific Coast, tanks ........ lb. | .06 | .07 | .06 | .08 | .09¼ | .07 | .10⅞ | .09 |
| Domestic tanks, f.o.b. mills, ........ lb. | ..... | .06 | .05 | .07 | .08½ | .07 | .10½ | .08¼ |
| Crude, bbls NY ........ lb. | .051 | .06 | .051 | .08 | .10¾ | .10 | .12¾ | .11½ |
| Tanks NY ........ lb. | .065 | .07 | .065 | .08 | .09¾ | .09 | .11½ | .10¼ |
| Refined, bbls NY ........ lb. | .058 | .06 | .058 | .09 | .13½ | .13 | .13½ | .13½ |
| Sperm, 38° CT, bleached, bbls NY ........ gal. | .77 | .79 | .77 | .85 | .85 | .84 | .85 | .84 |
| 45° CT, bleached, bbls NY gal. | .72 | .74 | .72 | .80 | .80 | .79 | .80 | .79 |
| Stearic Acid, doubie pressed dist bags ........ lb. | .08½ | .09 | 08½ | .11 | .15 | .13½ | .18½ | .15½ |
| Double pressed saponified bags ........ lb. | .08½ | .09 | .08½ | .12 | .15½ | .14½ | .19 | .15¾ |
| Triple, pressed dist bags ........ lb | .11 | .11½ | .11 | .14 | .17 | .15½ | 20½ | .17¾ |
| Stearine, Oleo. bbls ........ lb. | ..... | .07½ | .07½ | .08¾ | .09½ | .08¼ | .12 | .09¾ |
| Tallow City, extra loose ........ lb. | ..... | .02⅞ | .02⅞ | .04 | .07⅜ | .04¾ | .08⅜ | .07 |
| Edible, tierces ........ lb. | .04 | .04½ | .04 | .06 | .09¼ | .05½ | .10½ | .08 |
| Tallow Oil, Bbls, c-1 NY ........ lb. | .07 | .07½ | .07 | .08¾ | .11 | .08½ | .12 | .10¾ |
| Acidless, tanks NY ........ lb. | .07⅞ | .09 | .07⅞ | .09 | .10 | .08¼ | .11 | .09¾ |
| Vegetable, Coast mats ........ lb. | .06 | Nom. | .06½ | Nom. | Nom. | .06½ | Nom. | .08 |
| Turkey Red, single bbls ........ lb. | .07 | .09 | .07 | .10 | .12 | .10 | .12 | 11 |
| Double, bbls ........ lb. | .09 | .11 | .09 | .10 | .16 | .13 | .16 | 14 |
| Whale, bleached winter, bbls NY ........ gal. | ..... | .74 | ..... | .74 | .74 | .74 | .80 | .74 |
| Extra, bleached, bbls NY ........ gal. | ..... | .61 | .61 | .77½ | .76 | .76 | 82 | .76 |
| Nat. winter, bbls NY ........ gal. | ..... | .58 | .58 | .72 | .73 | .73 | 78 | 73 |

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# "We"—Editorially Speaking

Recent trends in our phosphate rock sales are rather startling, and will provoke serious thought in the industry. For years we have had the upper hand internationally in sulfur, naval stores, borax, and phosphate rock. That one is seriously challenged in the markets of the World, after almost complete dominance for several decades, shows how uncertain is a position based solely on ownership of natural resources. Mr. Kalish, who compiled these phosphate figures is out of the University of Chicago but five years, but his experiences have been wide and varied. A year as chemist with National Aniline, he joined the staff of Dr. William M. Grosvenor. In 1929 he was connected with the editorial department of Chemical Markets and for the past two years has been Chemical Economist for Amtorg Trading, the Soviet representative in this country. Mr. Kalish's powers of assorting facts dug out of an almost overwhelming mass of chemical and trade data is known to many of our readers. Another article on nitrogen is scheduled for an early issue.

Both S. J. Cook, who writes about Canada's recent advances, and Charles S. Wehrly, who explains the reasons for the spectacular drop in mercury prices, are known to many readers of Chemical Markets. Mr. Cook's most recent article in this paper was "Chemical Statistics," while the one previous to that was "Chemicals in Canada Since the World War." He is still connected with the Research Council and as Chief of the Chemical Branch Dominion Bureau of Statistics, he is decidedly "in the know" on all things chemical We think it fair to tell our readers that Mr. Cook prepared the last part of the manuscript in a wheelchair—forced there by a careless motorist. Fortunately, Mr. Cook's injuries were not of a permanent nature.

The bare facts of Mr. Wehrly's career appear in "Who's Who in the Drug and Chemical Industry", but do not even hint at what a pleasant companion he is when his huge, faithful, but disreputable looking pipe is lit. To tell about Mr. Wehrlys' qualifications to the title of the outstanding expert on the history and commercial aspects of the mercury market is painting the lily for every one, even slightly acquainted with the field, is acquainted with the fact. What most of our readers do not know is that it is highly dangerous to engage him in either a game of bridge or in a discussion of raising roses out on Long Island.

The Cabots of Boston have spoken to the Kubitskys—but only through the courts. Samuel Cabot, has filed a bill in equity asking that Samuel Kubitsky, also in the paint business, be restrained from using the name Samuel Cabot. Kubitsky said that as far as he knew Cabot was only a sort of nickname. "They all call me Chick Cabot," he added.

That Luther Martin IV should know about everything worth knowing about lampblack is not so surprising, coming as he does from a family whose name has been associated with that product for several generations. What is surprising is that he finds time among his sales activity and his hobby, flying, to write the historical description of the industry from its primitive inception to modern times when mass production methods, control equipment, and chemical analysis have revolutionized one of the earliest ancient arts. Mr. Martin began his training for his present position of Secretary of the Wilckes, Martin, Wilckes Company in the grimiest and lowest position possible at the United Oil and Natural Gas Products Co., at Cargas, La. After a year of study he returned to Camden and started a similar course of instruction through the Wilckes, Martin, Wilckes plant. He did verything from burning to packing ma- ial, even operating the furnaces. After of this practical training he came to York Offices of his Company and d the sales end of the business, g as an assistant to Luther Martin he was placed in charge of purchas- and advertising and later was appointed Assistant Sales Manager. In six years from the day when he started operating a lampblack furnace he was made Secretary of his Company when it became a division of the Swann Corp. Mr. Martin and his plane are in great demand by the officers of the various Swann Divisions. His ready wit has assured many a timid first-time traveler over the rough spots of the Appalachians.

In abstracting that very suggestive paper on "Control Methods in Chemical Operations", which Dr. G. A. Perley read before the Montreal Section of the Society of Chemical Industry, we quite inadvertently omitted the author's business connection. He is a member of the Research Staff of Leeds & Northrup, makers of precision instruments, of Philadelphia, and this makes a real difference, for naturally Dr. Perley's work has been with the instruments manufactured by this company.

Stewart J. Owen, Jr., is the author of the fourth and last in the series of articles specially written for the Plant Management Section of Chemical Markets on the various phases of chemical plant safety by engineers of the National Safety Council. Mr. Owen has been engaged in accident prevention and safety code work with the N. Y. State Department of Labor, Navy Department and the U. S. Bureau of Standards. During the five years he has been associated with the Council he has drafted about thirty original safe practices and industrial safety pamphlets and is now engaged in supervising the final completion of ten more. Further achievements and qualifications of Mr. Owen testify to his expert knowledge of "Specifications for Safety", but the proof of the pudding is in the eating. Read Mr. Owen's article if your are an executive, the purchasing agent, the plant manager or a foreman. It is of importance to every department of chemical manufacturing.

At one time or another we all attempt the impossible, and we hope that we filled our lifetime quota when we attempted in the October issue to present the New York Section, A. C. S. medal, more commonly known as the William H. Nichols' Medal to William H. Nichols, Jr. The tailor must make the cut to suit the figure and the editor, the caption to properly fit the cut or suffer the consequences of correction. D. G. Morgan, Jr., Secretary of the New York Section positively refused to be cajoled into telling us in advance who the real recipient is to be.

A big-and-bold, sandy-haired, outspoken executive who was tempted by its title to read an article on "The Elimination of Noise in the Chemical Industry" published in the current issue of one of the technical journals has protested violently that the author failed to suggest remedies for the impact of competition and the crash of falling prices.

# CHEMICAL MARKETS

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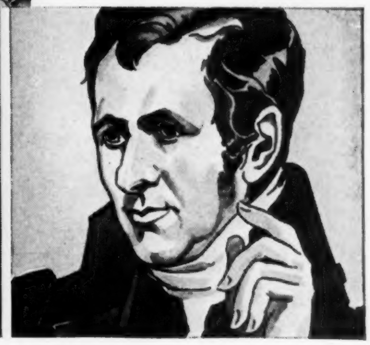
*No. 4 of a series of advertisements tracing the development and uses of modern chemicals*

## HIGH SPOTS IN CHEMICAL HISTORY

*Sir Humphry Davy's lecture hall at the Royal Institution, London, where an admission fee of twenty pounds was paid to see sodium produced by the electrolytic process. (Reproduced from "Famous Chemists" by Tilden with permission of the publishers, E. P. Dutton & Co., Inc.)*



*Sir Humphry Davy (1778-1829) whose research in alkalis enabled him to produce sodium by electrolysis.*

# CAUSTIC SODA

IN 1807 fashionable London paid twenty pounds a head to observe Sir Humphry Davy at the Royal Institution perform the miracle of the age... to see him produce sodium with a new-fangled electrical process. Davy's epoch-making discovery and his experiments in electro-chemistry marked the beginning of the modern electrolytic process for manufacturing caustic soda... the second most important product in the alkali industry. 1930 caustic soda consumption amounted to 640,000 tons... an increase of 100% in eleven years.

Heading the list of important American industries using caustic soda in manufacturing processes is the rayon industry. In 1930, 110,000 tons of caustic were consumed in making artificial silk. Petroleum refiners ran the rayon makers a close second by consuming 105,000 tons. Next in importance as consumers of caustic soda are the soap makers... 100,000 tons were used to help keep the nation clean. Chemical manufacturers used another 100,000 tons.

Also, included among the important caustic users are the paper mills who buy 42,000 tons a year. The textile industry needs about 30,000 tons annually for cotton processing and mercerizing. Farther down the list are leather tanning, rubber reclaiming, vegetable oil refining, lye making and the preparation of pharmaceuticals and medicines, all of which consume considerable quantities.

The shipment of liquid caustic in tank cars is a recent development which reduces handling costs and at the same time renders the product more convenient to quantity users.

• • •

*Centrally located warehouse stocks, high standards of uniformity and purity, helpful technical service and modern manufacturing processes are important features of Mathieson service to users of caustic soda.*

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Great Structures Rest on Strong Foundations

**Soda Ash... Caustic Soda... Bicarbonate of Soda... H T H (Hypochlorite)... Liquid Chlorine... Bleaching Powder... Ammonia, Anhydrous and Aqua... PURITE (Fused Soda Ash)... Solid Carbon Dioxide**

*The* MATHIESON ALKALI WORKS *(Inc.)* 250 Park Ave., New York, N.Y.

Philadelphia Chicago Providence Charlotte Cincinnati

*Works:* Niagara Falls, N.Y., Saltville, Virginia *Warehouse stocks at all Distributing Centers*

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**BORAX:** Under rigid manufacturing and refining processes, the highest standards of purity and quality are consistently maintained in Stauffer Borax. Refined and U. S. P., Stauffer Borax is available in powdered, crystalline or granular form for immediate or future shipments.

**BORIC ACID:** Your most urgent need for **Stauffer Boric Acid** can be supplied promptly from factories in California or warehouse stocks in principal cities. Produced in granular, crystalline or powdered form (Refined and U. S. P.) to meet the most exacting requirements. Let us quote on your next order.

**AND** *other quality products:* Any Stauffer product means dependability and uniform high quality. Here is a partial list of the many products available: Sulphuric Acid, Caustic Soda, Titanium Tetrachloride, Silicon Tetrachloride, Sulphur, Tartaric Acid, Carbon Bisulphide, and Carbon Tetrachloride.

## STAUFFER CHEMICAL CO.

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Rives-Strong Bldg.
Los Angeles, Calif.

713 Petroleum Bldg.
Houston, Texas

2601 Graybar Bldg.
New York, N. Y.

Carbide & Carbon Bldg.
Chicago, Ill.

# CONSTANT *as the* "TRADE WINDS"

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ALKALI

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Bicarbonate of Soda
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Diamond Crystals
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# Diamond Alkali Company

**Pittsburgh, Pa., *and Everywhere***

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DOW PHENOL is manufactured to exceptionally high standards of purity. It has a melting point of over 40°C., is water white in color and gives a clear water solution. Manufacturers of synthetic resins, paints and varnishes, paint and varnish removers, and numerous other products have come to rely upon its uniform high quality. It is manufactured in the largest operating synthetic Phenol plant in the world. Our large volume production insures dependability of supply in any quantity. Let us quote on your requirements.

**Dow Industrial Chemicals Include**

Aniline Oil
Calcium Chloride,
  Flake 77-80%, Solid 73-75%
Carbon Bisulphide 99.9%
Carbon Tetrachloride 99.9%
Caustic Soda, Flake and Solid
Chloroform
Epsom Salt Technical
Ethyl Bromide
Ethyl Chloride
Ferric Chloride
Ferrous Chloride
Magnesium Chloride
Monochlorbenzene
Monochloracetic Acid
Phenol
Sodium Sulphide
Sulphur Chloride

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